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THE OBJECTIVES OF THE AMERICAN MEDICAL ASSOCIATION

President's Address

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In San Francisco one year ago the House of Delegates of the American Medical Association conferred the highest honor within its power on one of our nation's great medical statesmen, Dr. Olin West. It was a fitting climax in the life of a man who for more than twenty-five years had been a loyal servant to the medical profession. It is appropriate on the occasion of the Centennial Celebration to pay this word of tribute to that Southern gentleman who elevated his profession, served his nation and enriched his fellow man.

The American Medical Association is highly honored to have as its guests so many distinguished men from other nations of the world. Medical science extends beyond national frontiers. A discovery of importance in one nation ultimately becomes the property of all. The World Medical Association in the field of health is developing a program to facilitate the spread of medical knowledge to all parts of the world. The American Medical Association is cooperating in the program for extending the benefits of science beyond the frontiers of its native land.

THE FIRST MEETING

In Philadelphia in May 1847 a group of doctors stimulated by Nathan Smith Davis drew up plans for a national medical organization. Physicians with forward vision early recognized the need for stabilization in the training of doctors. The first objective for the new organization was a uniform and elevated standard of training leading to the degree of M.D. to be adopted by all the medical schools in the United States. Two hundred and fifty delegates representing some forty medical societies and twenty-eight medical colleges from twenty-two states and the District of Columbia attended the first meeting. Dr. Nathaniel Chapman, a Philadelphian, was elected the first President.

Medical science has progressed further in the last one hundred years than in the previous twenty centuries. Comparison of the medical training in 1847 with the highly organized system of medical education in 1947 indicates the long road which medicine has traveled. The first objective of the American Medical Association through the entire century has been a determined drive for a high standard of training.

At one time one hundred and sixty-five medical colleges in our country offered courses in medicine. Some schools admitted students directly from high school; others accepted young men with an elementary education. The training was for the most part sketchy.

Standardization on a high plane has resulted in an educational program for the development of doctors who are well instructed in the scientific treatment and understanding of disease.

Medical education has benefited greatly by the work of the Association of American Medical Colleges, the National Medical Examining Board, the Federation of State Licensing Boards and the Carnegie Foundation. Special credit is due Abraham Flexner and Nathan P. Colwell of the Council on Medical Education and Hospitals of the American Medical Association, who surveyed the medical schools of the nation soon after the turn of the century and made far reaching recommendations.

1897—THE HALF CENTURY MARK

In 1897 the really big news as carried in the history of this Association was the celebration of the Semi-Centennial in Philadelphia. A world famous surgeon was President, Dr. Nicholas Senn of Chicago. Four of the original founders were still alive: Drs. N. S. Davis of Chicago, Alfred Stille of Philadelphia, J. B. Johnson of St. Louis and D. F. Atwater of Massachusetts. Dr. Senn commented on the advancement of medical education, the improvement of American medical literature, the scientific work of the Association and the development of THE JOURNAL. He commented on the steady growth of the Association and praised the membership of 9,000, predicting that on the occasion of its hundredth anniversary the membership might increase to 75,000 or even 100,000. His estimates of success were sound: the membership of the Association now totals over 131,000 active members. Dr. Senn predicted that inventions and discoveries beyond the conception of his day would be reviewed by the hundredth President of the American Medical Association. The distinguished Senn looked for the growth of medicine and surgery into exact sciences and predicted that organized medicine would contribute liberally toward this end. His vision has proved correct. The dramatic triumphs in the field of public health, sanitation, and preventive and curative medicine have occurred with increasing rapidity as the exact methods of science have displaced empiricism and theory.

CHARLATANS AND PATENT MEDICINES

A review of the history of the Association which has appeared in THE JOURNAL during the past six months from the pen of its talented Editor describes the lively

President's address before the American Medical Association at the Ninety-Sixth Annual Session, Atlantic City, June 10, 1947.

interest which the Association has always taken in running down pernicious nostrums and worthless patent medicines for which the public each year squanders millions, and the investigation of dangerous quacks who prey on the gullibility of the public, offering high hope of sure cure for the sole reason of financial gain. These busybodies might be ignored were it not for the cruelty inherent in their methods.

An energetic campaign of education of the public is making it increasingly difficult for charlatans to practice their nefarious trade.

The code of ethics which governs the practice of medicine endeavors to protect an uninformed public against the claims of the charlatan. It states that "it is unprofessional to promise radical cures; to boast of cures and secret methods of treatment and remedies; to exhibit certificates of skill or success in the treatment of disease, or to employ any methods to gain the attention of the public for the purpose of obtaining patients."

When a reputable physician is in doubt he promptly requests consultation. The sole aim of such consultation is the benefit to be derived by the patient.

MEDICAL RESEARCH

Spectacular advances have taken place since the turn of the century in various fields of science. Medicine is not slow to investigate each new discovery in the hope of uncovering some valuable lead for the control of disease. Ever since its inception the American Medical Association has established inducements of various kinds to encourage medical research. Grants are awarded from year to year, special studies are fostered, and every encouragement is given to the utilization of the vast resources of the Association, which are made available for research in all fields of pure science and the medical specialties. Medicine in truth is a branch of biology; today medicine looks to the fields of pure science, physics, chemistry, botany, general biology and other branches of science for assistance in charting new paths in the control of disease and the improvement of public health. More than $1,000,000 has been contributed by the American Medical Association for fundamental investigations; from time to time further assistance is being made available as opportunities arise.

PUBLIC EDUCATION

Early in the development of the American Medical Association doctors were urged to take an interest in informing the public of the affairs of medicine and how they affected the public weal. Benjamin Rush, a Philadelphian and a leader in medicine at the time of the American Revolution, urged a campaign for the education of the public. Almost continually since the creation of the Association interest in public education on health matters has been one of its activities. Lectures and campaigns with reference to the protection of vision, the control of venereal disease, the importance of early recognition of cancer and the desirability for universal vaccination have been fostered. In recent years the public health magazine *Hygeia* has been published; its circulation runs into the hundreds of thousands. The people of this nation write over half a million letters a year to the Association headquarters to inquire concerning various aspects of health problems. Today the nation looks to the Association for authoritative information.

PUBLIC HEALTH ACTIVITIES

Early in the affairs of the American Medical Association the members urged the formation of State Health Departments for the purpose of developing public health facilities throughout the entire nation. The Association recommended the creation of a United States Public Health Service. Throughout its entire career organized medicine has urged governmental bodies to utilize all proved scientific measures for the protection of public health. All the resources of the Association are at the command of the national and state departments of health for the promotion of research, the education of the public, the support of campaigns for the study and control of cancer, heart disease, tuberculosis, industrial health and other activities. The Association has demonstrated leadership in campaigns for accident control in the home, on the highway and in industry. From the outset the organization urged the use of reason and understanding rather than emotional blindness in combating fanatic anti-medical groups whose policies, if followed, would have forbidden the discovery of antitoxin, insulin and a number of other valuable agents whose therapeutic properties were humanely demonstrated on laboratory animals. It might be noted here that at no time has the American Medical Association ever made an appeal for funds from any agency outside its membership.

DOCTORS AT WAR

When a national peril has arisen the doctors of the nation have been among the first to don the uniform. In World War I approximately 38,000 physicians were in uniform. The American Medical Association turned its interest in the support of the national program toward successful prosecution of the war. Through educational channels and by other important practical measures it contributed to an increase in the efficiency of medical service. THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION was a most important medium in the distribution of information on military affairs, and in stimulating physicians to maintain medical service for the armed forces at a high level of effectiveness. THE JOURNAL carried articles on practically all phases of military medical service. Discussions concerning the base hospitals and the formation of hospital units appeared. In 1917 THE JOURNAL carried important data in regard to training camps. After World War I Gen. Merritt W. Ireland wrote to the President of the Association concerning the possibility of studying the experiences of the members of the medical profession during the war. Unsolved problems at that time included the consideration of representation of the medical department on the General Staff, control by the medical department of its own personnel, supplies and building program and, finally, appropriate recommendation concerning the qualifications of officers.

During World War II over 60,000 doctors at one time or another were in uniform. It has been stated that 90 per cent of the medical work was carried on by the reserves of the nation. The American Medical Association promptly mobilized for action when the war clouds began to loom. The Association at all times has a classified directory of its membership. The superb editorial and publishing facilities of the Association created a magazine entitled *War Medicine*, which carried important articles bearing on significant developments in this field.

In view of the importance of having a highly effective medical program available in the face of another national catastrophe, the House of Delegates directed that a study be made of the experiences of doctors during the last war. From the investigations which the committee appointed by the Board of Trustees has conducted, certain definite conclusions have been drawn. In the event of another war, and it is almost too much to hope that the world has seen its last conflict, it will be of the utmost importance to have an overall coordinated program built on the predicted medical needs of all portions of the population. In view of the unsettled state of international relationships the need for this program is imminent. Such a plan should be worked out with the consideration of all aspects of medical service, including the need for premedical selection and deferment, the assignment of doctors in appropriate categories, flexibility of mobilization, rotation of personnel and due attention to research. Such a program is not the sole concern of military authorities. It vitally affects every person in the nation, and certainly the American Medical Association with its membership of more than 130,000 cannot escape its responsibility in facing this challenge to national security. The nation trains just so many physicians per year, and the limited supply makes it of paramount importance that their talents be effectively utilized.

THE SUPPLY OF DOCTORS

Considerable comment has been offered in recent years on the number of doctors which the country now needs and will require in the future. Before the war there were more doctors per population in the United States than anywhere else in the world. After the outbreak of war classes in the medical schools were enlarged, the programs were accelerated and students were graduated in three years. With this stepped-up program some medical schools graduated one, and others graduated two extra classes, producing over 10,000 extra doctors in the last six years. Recently three new medical schools have been organized, and more are under consideration, particularly in the South. Due caution should be urged in plans for the establishment of more schools, since there is no essential relationship between the number of medical schools and the distribution of physicians. Costs of medical education are rising enormously, while at the same time the financial support, particularly from private sources, has diminished with equal rapidity.

Statistics indicate that there are approximately 2,000 more physicians being graduated per year now than the annual number of deaths among members of the profession. It must be admitted that shortages of physicians exist in certain areas of the nation. The statement that there are a great many counties in the various states without any physician at all is not especially significant, because many such areas are entirely too sparsely populated to require even one doctor in residence. Further, adequate medical facilities in adjacent counties are usually available. Greatly improved traffic lanes and excellent transportation facilities have minimized the problem of obtaining medical service on demand in hospitals or health centers. The avidity with which large numbers of persons move from place to place for medical attention, even passing excellent hospitals to obtain service at a distant point, suggests that there may be some additional satisfaction in the travel angle.

Approximately 40 per cent of practicing physicians were in military service. With a reduction of doctors on the home front the nation's health was better than ever. From this aspect one might conclude that the fewer doctors, the better the health of the people. As rapidly as it can be safely accomplished, the medical branches of the armed forces have been releasing physicians to inactive status. Instead of promptly returning to practice and thereby alleviating the need for doctors on the home front, a large number of discharged officers are engaged in postgraduate study. Some authorities estimate that up to 20,000 physicians who will ultimately return to civilian practice are still in graduate training.

In addition to those who have been discharged, the Army and Navy have inducted a large number of recent graduates who ordinarily would have entered private practice after internship or residency. Within a year or two this practice will be largely discontinued so that doctors recently graduating from schools and hospitals will be entering civilian practice in addition to the large number of older men who will in two or three years have finished their graduate training. With this sudden release of physicians into civilian practice there may in reality be more physicians than the country requires. Is this in the public interest? On the surface it would appear so. However, authorities believe it would react in just the opposite manner. When doctors do not have sufficient practice to keep busy and thereby earn an income to meet their needs, professional deterioration will occur and the incentive for advanced study is gone. With the loss of professional proficiency medical service deteriorates.

Finally it was recently stated before a congressional committee that more physicians should be trained because the armed forces are unable to recruit a sufficient number of doctors for the regular medical corps. Training more physicians will not create professional incentive for a career with the armed forces. The experience of a large number of civilian doctors during the recent war gave them an opportunity to compare practice under governmental control with private practice. With the creation of adequate professional opportunities for practice, study and research the medical service of the armed forces would be in a position to attract graduates interested in military medicine as a career. This problem is an important one in the interests of national security.

MEDICAL PREPAREDNESS

In the event of another catastrophe the use of atomic energy, biologic products, chemical agents and psychologic propaganda will, in all probability, represent the main types of military aggression. The medical needs of the nation must be determined in the light of this new knowledge. The use of these new and widely destructive agents must be kept in mind in any adequate program for the future security of the nation.

Organized medicine should play a prominent role in the formulation of a medical program that will require the participation of every physician in the nation. A National Emergency Medical Service Administration made up of representatives of organized medicine and related groups should make an exhaustive study of national needs. Appropriate recommendations need to be drawn up and presented to the President of the United States and the Secretaries of War and of the Navy. Past experience demonstrates the need for a

peacetime program that will minimize the isolationism between the military medical services and civilian medical practice. Military medicine has many attractive features. Whatever shortcomings exist may readily be corrected by an impartial study of basic requirements.

SPECIALIZATION AND CERTIFICATION

In recent years specialization has advanced to a point where the majority of younger members of the profession are looking forward to some form of specialized practice. A survey indicated that a few years ago 67 per cent of the men anticipated limiting their practice to a particular specialty. Discussions on the role of the family physician and the future of the practice of general medicine have engaged the serious attention of the House of Delegates at its recent meetings. The Council on Medical Education has been advised to consider the possibility of recommending that general practice be developed as a specialty.

At a recent meeting of the Joint Committee for Coordination of Medical Activities a significant report was offered. In recognition of the importance of general practice, this committee pointed out that a Section on General Practice of Medicine has been created as a part of the Scientific Assembly. This is a definite contribution as far as it goes. It would be rather difficult to crystalize the boundaries and the limitations of general practice. Ordinarily the general practitioner is capable of handling the majority of the ailments of his clientele. When he needs help he calls for the specialist. The modern family doctor has adequate facilities at his command in the form of current periodicals and authoritative works by distinguished teachers. Postgraduate courses are being conducted throughout the length and breadth of the nation by county and state medical societies for the instruction of all physicians regardless of affiliation. These extension courses, some of which have been carried on in collaboration with various organizations, have proved eminently successful.

With the rapid increase in medical knowledge and the continuing improvement in medical training, graduates from the seventy-seven approved schools of the nation, regardless of their ultimate special field of practice, will require hospital facilities for the study and treatment of a certain number of their clientele. It is probable that the medical needs of the nation could be satisfactorily met if approximately two thirds of graduates would plan for general practice and one third prepare themselves for special fields. There are about 21,000 specialists certified by specialty boards and around 131,000 other practicing physicians at present.

The certifying boards were created to insure that the highest standards of performance would be furnished the public. For the purpose of measuring the qualifications of candidates for special practice, various written and oral examinations have been given. At no time has any suggestion been made by the specialty boards to any medical institution, school or hospital that certification should be a prerequisite for appointment to the faculty or staff.

ECONOMIC RESEARCH IN MEDICINE

With the advance of medical science and the elaboration of complex procedures for diagnosis and treatment, the costs of medical services have become increasingly important. Expensive hospital procedures and long continued illness are costly items which, without previous planning, have frequently proved burdensome. The American Medical Association has long been cognizant of this problem. Since 1930 the Bureau of Medical Economic Research has been investigating various aspects and encouraging studies in particular areas for the purpose of arriving at a practical and satisfactory solution. Although the majority of common ailments do not create a serious financial burden, prolonged illness and major surgical operations frequently do. The prepayment medical care plans which are being promoted by the American Medical Association and under which approximately six million citizens are now covered are designed to give the American people a chance to choose between "budget and bludgeon."

At present the Bureau of Economic Research of the Association is expanding its studies in this field under a professional economist. Under various plans voluntary health insurance has proved valuable to some forty million of the nation's population, as estimated from enrolment statistics. The American Medical Association has approved the principle of voluntary health insurance for hospitalization and medical care. The criterion on which approval is based is the requirement that a high quality of medical service be made available without interfering with the physician-patient relationship.

The American Medical Association will promptly support any suggested alteration in furnishing medical care to the nation which will in reality guarantee a higher quality of service.

OPPOSING FORMS OF GOVERNMENTS

Two philosophies of government are striving for supremacy in world affairs today. One believes in the dignity and the emancipation of the individual. It endeavors to guarantee freedom and opportunity for human betterment, imposing only those conditions which are necessary for the protection of society. In this form of government the state serves the people and is responsible to them. With adequate safeguards and checks the nation under this philosophy has flowered and grown strong.

The other form of government, in which the state is supreme, restricts individual liberty and continually limits individual rights and privileges. The vast majority of physicians in this nation is definitely committed to the democratic principle and combats vigorously any attempts to regiment the members of the profession and to make them subservient to a bureaucracy. If the trend of national affairs should move in the direction of socialism, then the professions, industry and labor must realize that their regimentation will not be long delayed. Compulsory taxation cannot be termed insurance, nor can health be gained by governmental decree. American medicine is dedicated to the high interest of social progress and will cooperate for the creation of a program of expanding medical service to all portions of the population. It will determinedly resist any visionary schemes that would embarrass the medical profession in its endeavor to furnish a satisfactory service to those in need. Comparative statistics from other nations have not demonstrated medical service superior to that of this nation. Nowhere has sickness been reduced; wherever the government has intervened between physicians and patients complaints have greatly increased in number.

A recent estimate indicates that the creation of a political medical program for this country would

involve sums so tremendous as to be staggering in their totality. American medicine is keenly alert to the dangers lurking in visionary promises for governmental participation of a paternalistic nature that would reduce the quality of service and stifle professional initiative.

COMMUNITY HEALTH NEEDS

At present the American Medical Association is conducting a number of important investigations on community health needs, the distribution of doctors and the rural practice of medicine. It is particularly interested in hospital facilities and the maintenance of standards of hospital service.

The hospital is an important instrument for the public welfare. It has potentialities for education of the public as well as the members of the medical and nursing staffs. More and more the practice of medicine is stressing details of hygiene, prevention and prophylaxis of disease and the importance of early diagnosis. From an educational point of view the hospital should be a teaching center for the maintenance of health, the early recognition of disease and, finally, treatment. Members of hospital staffs in effect are engaged in the group practice of medicine. Some staffs are highly organized and definitely so regarded, while others carry on the spirit of group practice but are not so incorporated.

The central feature of the modern hospital should be the diagnostic clinic with a staff of general practitioners plus specialists as determined by community needs. The better the facilities for the study and treatment of disease in its incipient stages, that is, when patients are ambulatory, the less need will there be for confining patients to hospital beds for mere routine study. This field of rich opportunity needs much more development than has taken place to date. Augmentation of hospital staffs will furnish increased opportunity for general practitioners to participate in conferences and follow their own patients through the channels of investigation and treatment. Finally, members of the hospital staffs should be sufficiently interested in furthering the study of disease to carry on investigations from time to time and to make reports on carefully controlled observations. In this way the influence of medicine will continue to expand in each community and the level of service there will continually grow in proficiency.

PUBLIC RELATIONS

The interpretation of medical activities bearing on the health of the nation in terms of public understanding is a prominent responsibility of the members of the medical profession. Support and confidence of the public is essential to satisfactory medical care. To keep the channels open for informing the American public of significant events in the world of medicine the American Medical Association has developed a number of valuable activities. News releases, the use of the radio, *Hygeia* and units of the Woman's Auxiliary have functioned admirably. The relationship between the profession and the fourth estate, the ladies and gentlemen of the press, has always been most amicable. Due credit here should be given to the high quality of accuracy with which medical news has been interpreted in the lay press. Science has a constant ally so long as truth can be revealed uninfluenced by political pressure.

Public relations at the individual, community or national level is largely a matter of friendly understanding. When a large amount of important information bearing on the public welfare becomes available, its widespread dissemination is the proper function of organized medicine. With this in mind the Association is taking energetic measures to keep the public informed of its problems and accomplishments.

Members of the profession have an obligation to inform communities in which they reside of the ideals toward which medicine is striving. Too few doctors have schooled themselves in the art of expression before lay groups. As members of a learned profession dedicated to the welfare of their fellow men, physicians are unusually experienced in matters of social importance. It would appear, therefore, that an active part in community civic affairs would extend the influence of the physician and aid in offsetting the influence of visionary planners who are out of touch with reality.

MEDICAL ALLIES

This is an appropriate occasion for the doctors of the nation to express their gratitude to their loyal colleagues who have done so much in advancing the common cause, the "Nightingales" of America, the nurses without whom the present high quality of medical service would have been impossible of attainment. Organized medicine is in close touch with the perplexing problems facing the nurses today and will furnish every assistance possible in reaching solutions to bring greater satisfaction and security to those engaged in one of the noblest of the arts.

Medicine requires libraries for education, precision instruments for performance and accurately assayed drugs for treatment. The story need be told of those groups who create the volumes, instruments, and drugs for the profession. In these fields a precision of technic is required which permits no inaccuracy. It is of the greatest importance that those articles which are the doctor's stock in trade should be of the best quality and usefulness.

The allies of the medical profession have the same goal as the physicians, the same triumphs and defeats. In a sense they complement one another; the success of one reflects credit on all.

Some of the finest research in the medical world at the present time is being carried on in laboratories of large pharmaceutical organizations. They have called into counsel leading authorities from the far ends of the earth. Any performance less than the best is not acceptable.

It should be emphasized that laboratories for medical research are not the sole concern of medical faculties or the foundations. High credit is due those organizations which have joined forces in exploring new fields in a search for more effective weapons in the control of disease.

In the enchanting field of research a number of allied groups are engaged, colleagues in the same cause, using the same blueprints and libraries for reference. Plans are worked out together, and when success crowns any project one group prepares the product and the physicians administer it.

The kinship of various groups allied in a common cause offers a guaranty of continued progress in the advancement of medical knowledge.

SOCIAL MEDICINE

Medical statesmen have a role to perform in helping to shape the destiny of national affairs. Doctors are interested not only in the physical health but, of even

greater importance, in the peace of mind of their clientele. These turbulent times precipitate sharp clashes between individuals and their environment that are reflected in physical or mental ailments which send folks, heavyhearted, to their family physicians.

The medical practitioner today is studying not only the individual but his relationship and reaction to other members of his family and his community. Unstable society is likely to engender an increased number of neurotic reactions on the part of citizens. Family doctors in the role of shock troops of modern medicine study their patients in the light of these social problems. There is nothing essentially new in the story of social medicine and its pathology. Whereas individual pathology considers the disorders of the patient, social pathology reflects the disorders of his surroundings. While the terms are new the problems are old. The increasing number of patients with hypertension, peptic ulcer, thyroid disease, rheumatic disorders and the neuroses reflects the inability on the part of these patients to adjust to the tempo of modern society. Medicine's field of vision has expanded in accordance with the changing pattern of the diseases of modern civilization, and the physician is energetically inquiring into improving the methods of their control.

CHARTING NEW SEAS

Medical research has sharpened its weapons for probing the secrets of those common disorders which threaten human existence. The real zest of life is at the growing edge where the frontiers are expanding. Research workers probe into the terrain of the unknown and, in the last quarter century, have discovered new methods for the control of the anemias, diabetes, infectious and contagious diseases, nutritional deficiencies and for the correction of abnormalities which previously threatened life. With the onward march of medical science the diseases which exacted such a large toll in infancy and the early years have been brought under control.

Across the centuries many improvements have come through social progress. While no comprehensive measure or index is available, we can regard each specific accomplishment in the broad area of social progress as being reflected in the length of human life. Twenty centuries ago the life expectancy of Roman citizens of the upper class was approximately twenty-five years. In 1847, the year when the American Medical Association was founded, the average future lifetime at birth was approximately forty years. In 1947 it is estimated to be almost sixty-seven years. Hence on the occasion of this Centennial celebrating one hundred years of organized medicine, there can also be celebrated a century of phenomenal progress in man's fundamental attempt to avoid death. A gain of from approximately forty years to almost sixty-seven years as of June 1947 is indeed one of the greatest accomplishments in the history of mankind. We salute the American people on this great achievement in survival. Truly, we are today celebrating the century of the greatest social progress in the history of the human race.

The doctor of medicine has been the agency through which most of these fundamental improvements in man's environment and in the control of disease have actually reached the people. Organized medicine can look back on this century with the assurance of a great contribution to the efforts of the American public to continue living longer.

Great as has been the advance of medicine in the past twenty-five years, even more spectacular is the promise for medicine during the next quarter century. The American public can rest assured that the members of the medical profession in this land will carry on a never ceasing battle to bring the destructive agents under control and free the population from the hazards that interfere with the daily lives of so many. The scientific method indeed is paying rich dividends in probing the realm of the unknown; yet to be clarified are the major problems of today which influence and govern the conduct of each individual. In the words of Walter B. Cannon, "It is the inhumanity of human beings that spoils the achievements of science." If on the one hand the atomic age has brought the atomic bomb, on the other it offers highly effective weapons for the enhancement of human existence.

Civilization is at the crossroads and must decide in what direction to go. Cannon asks what can be done to improve human behavior and describes it as the supreme challenge, the most important frontier yet to be explored. The scientific method, the search for truth—therein lies the hope for more stable relationships. While the scientific method has had spectacular triumphs in revealing the mysteries of the physical world, its greater opportunity lies in the direction of probing those forces which control the activities of men.

There are potent biologic factors which shape human destinies, only a few of which have recently been evaluated. Progress has been made, however, in the realm of the endocrine glands. A cretinous youngster may be transformed into a normal child. Violent reactions of an emotional nature can be evoked or abolished at will by experimental means. Cannon has opened the door and indicated what lies within. He states that physicians are now beginning to learn more about the fundamental traits common to man and his humbler relatives. Possibilities now exist of becoming acquainted with powerful factors which may deeply affect human dispositions and reactions to external conditions. Medical science now is beginning to utilize the experimental method for understanding man's reactions and ways of influencing them.

Man is not a reasonable creature; he is ruled by his impulses and emotions. These determine his actions. In the interest of self preservation science today needs to study the basic fundamental traits that influence the dispositions and actions of men. Herein is the great challenge, the new frontier, the hope of mankind.

In an address before this Association in 1910 Dr. W. H. Welch, then President, described organized effort as a distinguishing mark of modern civilization, as essential for the advancement of science as for the promotion of commerce.

New knowledge has given the family physician a greater control of the disorders which threaten the health of his patients. Organized medicine is taking the lead in improving the conditions of the worker in home, school, field and factory. On the occasion of the Centennial Celebration, the American Medical Association experiences a just pride in the accomplishments of American medicine and in the contributions the Association has made in the spheres of medical education and public enlightenment. It enters its second century with abundant vitality and renewed vigor, steadfast in purpose and confident in its ability to attain even greater objectives for the benefit of mankind

TREATMENT OF DUODENAL ULCERS

Partial Gastrectomy versus Palliative Resection

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In 1927 I presented, before the American Medical Association, a paper on partial gastrectomy versus gastroenterostomy in the surgical treatment of duodenal ulcers.[1] At that time the group of physicians performing gastroenterologic surgery at the Mount Sinai Hospital then headed by Dr. A. A. Berg was trying to introduce gastric resection with removal of the duodenal ulcer as an operation of choice.

The importance of this more radical operation for the avoidance of postoperative peptic ulcer was first emphasized by Haberer [2] in 1920. He pointed out that in order to achieve satisfactory results three criteria had to be met: (1) removal of the duodenal ulcer, (2) removal of the pylorus and (3) resection of at least 60 per cent of the stomach. The omission of the first two steps of this procedure cannot be compensated by increasing the extent of the resection toward the cardia.

At the outset the views of this group encountered widespread opposition. As time passed, however, a gradually increasing reversal of opinion was noted among many surgical colleagues. Today, advocacy of gastroenterostomy as the method of choice in the treatment of duodenal ulcer would probably be criticized as severely as was the recommendation of partial gastrectomy twenty years ago.

Though gastroenterostomy has lost most of its supporters as a method of choice, it is still used extensively in this country as a method of expediency. For instance, in 1944 surgeons at the Mayo Clinic [3] performed gastroenterostomies in 37 per cent of the cases of duodenal ulcers.

The terms subtotal gastrectomy and partial gastrectomy as applied to the operation for duodenal ulcer are apparently defined in a variety of ways by different surgeons. These variations have become so divergent that it seems wise to reiterate the proper definition of these terms. The expression subtotal gastrectomy was originally and correctly employed to describe the operation necessitated by the resection of extremely large gastric ulcers. It should be emphasized that this includes transection distal to the pylorus and the removal of four fifths of the stomach proximal to it.

In the early days of radical surgical intervention for duodenal ulcer (I use the word radical in contradistinction to local excision, pyloroplasty, gastroenterostomy, Eiselsberg or Finsterer operations) the term partial gastrectomy was used. Partial gastrectomy or gastric resection meant one thing then and should mean only one thing now, namely, removal not alone of two thirds of the stomach but of the pylorus and the duodenal ulcer as well. Operations which deviate from this technic should not be called partial gastrectomy for duodenal ulcer. For instance, if either the duodenal ulcer or the pylorus, in part or in toto, is left in situ, the procedure should be classified as palliative resection, a classification which has been employed by different authors for many years. If a surgeon removes part of the stomach and leaves the duodenal ulcer in its place, he is not warranted in calling the operation partial or, worse yet, subtotal gastrectomy. Unless a proper nomenclature is strictly adhered to, the records will be hopelessly confused. Unsatisfactory results will be attributed to partial gastrectomy in cases in which this operation had really never been performed (fig. 1).

The dangerous spread of a lax nomenclature even in some of the leading centers of surgical teaching is evident from a recent statement by McKittrick: [4] "At the Massachusetts General Hospital subtotal resection is the accepted operation for intractable duodenal ulcer. By subtotal resection we mean a removal of the distal two thirds of the stomach to or beyond the pyloric ring or the removal of all the distal two thirds except a small segment of the antrum from which the mucosa has been excised." McKittrick gives a good description of the so-called prepyloric and postpyloric resections, which were described by Finsterer [5] in 1918, a few years before Haberer showed the importance of the removal of the duodenal ulcer and the pylorus. The Finsterer operations may in rare instances be employed as makeshift operations in nonresectable ulcers. They should never be classified as subtotal gastrectomies. Finsterer considered his operations as methods of expediency for nonresectable duodenal ulcers in close proximity to the papilla of Vater, not as methods of choice. In ulcers situated in the first part of the duodenum (by far the most frequent location of the ulcers) he advised a typical gastric resection, both for anterior and posterior duodenal ulcers.

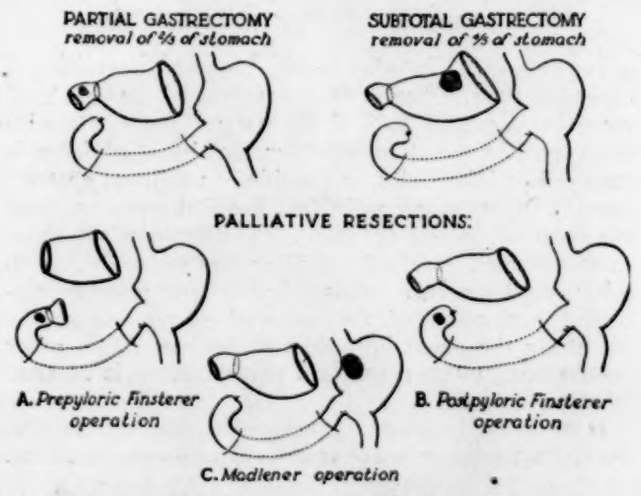

Fig. 1.—Different types of gastric resections for ulcer.

Rienhoff,[6] in reporting 260 gastrectomies for duodenal ulcer from the Johns Hopkins Hospital has stated that in over 75 per cent of the patients the ulcers were left in situ.

Even in the institution with which I am associated, this so-called conservative trend of leaving any not

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1. Lewisohn, R.: Gastroduodenal Ulcers: Partial Gastrectomy Versus Gastroenterostomy in Their Surgical Treatment, J. A. M. A. **89**: 1649 (Nov. 12) 1927.
2. Haberer, H.: Anwendungsbreite und Vorteile der Magenresektion Billroth I., Arch. f. klin. Chir. **114**: 127, 1920.
3. Counseller, V. S.; Waugh, J. M., and Clagett, O. T.: Report of Surgery of Stomach and Duodenum for 1944, Proc. Staff Meet., Mayo Clin. **21**: 17, 1946.
4. McKittrick, L. S.; Moore, F. D., and Warren, A.: Complications and Mortality in Subtotal Gastrectomy for Duodenal Ulcer, Ann. Surg. **120**: 531, 1944.
5. Finsterer, H.: Ausgedehnte Magensresektion bei Ulcus duodeni statt der einfachen Duodenalresektion bezw. Pylorusausschaltung, Zentralbl. f. Chir. **45**: 434, 1918.
6. Rienhoff, W. F.: An Analysis of the Results of Two Hundred and Sixty Consecutive Cases of Chronic Peptic Ulcer of the Duodenum, Ann. Surg. **121**: 583, 1945.

easily resectable ulcer in situ is favored by the present group in charge of gastric surgery. Colp [7] recently reported about the material on his ward service (1937-1943) at Mount Sinai Hospital. He stated that among 173 resected cases only 102 specimens contained the ulcer. In addition 48 (21 per cent) gastroenterostomies

Fig. 2.—Duodenal ulcer in close proximity to the pylorus.

were performed. In other words, his group performed a typical gastric resection with removal of the duodenal ulcer in less than half of the cases. On his service every gastric resection, whether the duodenal ulcer is removed or left in situ, is classified as subtotal gastrectomy. Other surgeons in this hospital have reserved the term of partial or subtotal gastrectomy for those cases in which the duodenal ulcer was removed. With this wide divergence in classification any accurate statistical evaluation of the material seems impossible. Naturally the same impasse will be reached in other institutions, unless a uniform nomenclature is adopted by every surgeon.

It is of the greatest importance to adhere closely to the correct technic in the treatment of duodenal ulcers.

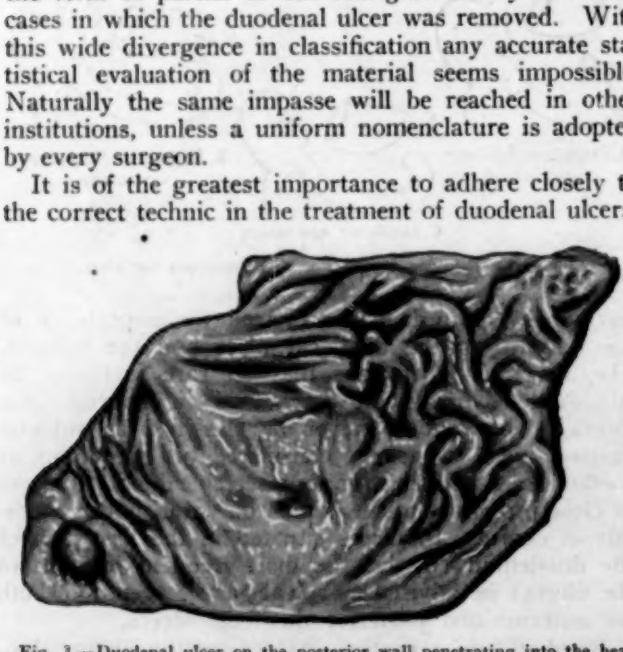

Fig. 3.—Duodenal ulcer on the posterior wall penetrating into the head of the pancreas. Pronounced inflammatory reaction surrounding the ulcer.

Removal of part of the stomach without removal of the ulcer will put the clock of progress back. It may present the mirage of an easy solution of a sometimes difficult technical problem, but it will fail to achieve good permanent results. For this reason the so-called postpyloric Finsterer operation was abandoned many years ago, except as a method of expediency in a relatively small group of cases. The recent attempt to revive this method will lead again to failure.

It seems peculiar that the importance which the complete removal of the pylorus plays in insuring satisfactory end results after partial gastrectomy for duodenal ulcers does not seem to be appreciated by many American surgeons. It is evident that some surgeons in this country try to steer a middle road between partial gastrectomy and gastroenterostomy. Undoubtedly they overestimate the inherent risks of including the duodenal ulcer in the gastric resection. The fact that an ulcer is situated on the posterior wall of the duodenum or that it is adherent to neighboring organs like gallbladder, colon or pancreas is not sufficient reason to declare an ulcer not resectable. However, as in subtotal gastrectomies for large gastric ulcer on the posterior wall with dense adhesions to the pancreas, it is occasionally advisable to cut around the duodenal ulcer and leave its base on the pancreas.

Two technical points are of great importance in dealing with duodenal ulcer: (1) The line of dissection should be below, not above, the ulcer, and (2) a sufficient portion of normal duodenum should be freed on its posterior wall from the surrounding tissue, especially the pancreas, to allow a safe closure of the duodenum.

The frequent impossibility of leaving the duodenal ulcer in situ and simultaneously establishing a safe

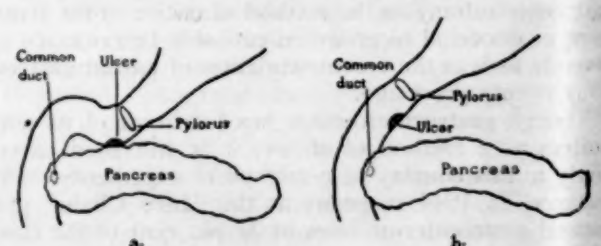

Fig. 4.—Duodenal ulcer in its relation to the pancreas and common duct (*a*) before and (*b*) after the freeing of adhesions (diagrammatic).

closure of the duodenum is well demonstrated in a number of drawings which I published in a paper entitled "Persistence of Duodenal Ulcers After Suture of an Acute Perforation." [8] These drawings show that it would have been impossible to exclude the ulcer from the resection without leaving the pylorus or part of the pylorus behind. In the first specimen the ulcer was located right at the pylorus (fig. 2). In the second case the punched-out ulcer was surrounded by an area of intensive inflammatory tissue, which fixed the ulcer to the pancreas (fig. 3). In order to free the ulcer properly a part of the pancreas had to be resected. The patient made an uneventful recovery. If the ulcer had been left behind, the surgeon would undoubtedly have left part of the pylorus and possibly part of the antrum in situ. Most duodenal ulcers are located on the posterior wall either as single ulcers or as so-called kissing ulcers just beyond the pylorus. The operation of partial gastrectomy was not devised to include only easily resectable ulcers on the anteroir wall of the duodenum.

An ulcer on the posterior wall may, at the outset, give the impression that its removal would not leave sufficient space below the ulcer for a safe closure of the duodenum. However, figure 4 shows that by properly freeing the ulcer from the pancreas the removal of a

7. Colp, R.; Klingenstein, P.; Mage, S., and Druckerman, L. J.: Subtotal Gastrectomy for Duodenal Ulcer, Ann. Surg. **120**: 170, 1944.

8. Lewisohn, R.: Persistence of Duodenal Ulcers After Suture of an Acute Perforation, Surg., Gynec. & Obst. **64**: 172, 1937.

duodenal ulcer which seemed to offer considerable difficulty was transformed into a simple technical procedure.

The statement is frequently made that cases of duodenal ulcer with pyloric obstruction can be satisfactorily managed by gastroenterostomy. This is based on the mistaken idea that pyloric stenosis is usually due to scar obstruction and that the active ulcer is healed. Actually many of these stenoses are due to the inflammation and edema present about one or more active duodenal ulcers (fig. 5). Unless such patients are subjected to adequate resection, the danger of subsequent jejunal ulcer is considerable.

Success or disaster in gastric resection depends mainly on a safe closure of the duodenal stump. Even if it is possible to remove the pyloric ring in its entirety, the structures between the pylorus and the upper margin of the ulcer are usually so changed that a safe suture of the duodenum is impossible. In order to reach normal duodenal tissue the duodenal ulcer must be included in the resection. The duodenum should be freed sufficiently far on the posterior wall to allow an adequate two layer suture. The most important layer of suture is the first layer. Unless this suture is inserted with the greatest care a leak may occur. A second row of sutures reenforces the first layer. In some instances a third row of sutures may fix the duodenal stump to the capsule of the pancreas, thus burying the entire stump. As a rule drainage is not only unnecessary but contraindicated.

Drainage of the abdomen through a stab wound in the right flank as a method of choice is advocated by many surgeons who leave the ulcer in situ. It is the best proof that they are not convinced of the safety of the duodenal closure. Surgeons who complete the duodenal closure distal to the ulcer and thus are able to establish a safe suture line, find the use of drainage unnecessary in most cases. When a leak occurs the postoperative course is inevitably prolonged. Those who advocate leaving the ulcer in situ should publish not only their mortality but their morbidity figures.

The only reason for the unnecessary ultraconservatism in dealing properly with duodenal ulcers is an unduly exaggerated fear of postoperative pancreatitis. It is surprising that in spite of the progress which has been made in the surgery of the pancreas in recent years, some surgeons seem afraid to remove duodenal ulcers which disclose definite adhesions to the pancreas which may require sharp dissection.

No experienced gastric surgeon will deny that one occasionally encounters nonresectable duodenal ulcers, mainly those which involve the common duct so intimately that radical removal with dissection from the duct cannot be safely performed. Furthermore, the general condition of the patient may be so precarious that any major operation is contraindicated. For these two groups of cases, which are indeed rare (certainly not more than about 5 per cent of the duodenal ulcer material), a simple gastroenterostomy is the best method.

The conviction still widely held, that resection for duodenal ulcer is inevitably accompanied by an inherent high mortality, is certainly not substantiated by the amazingly low mortality figures reported by some clinics. For instance, Lahey[9] and his associates have performed 530 consecutive gastric resections for duodenal, gastric and jejunal ulcers with a mortality of 1.5 per cent. Incidentally, it should be pointed out that gastroenterostomies or palliative resections for duodenal ulcer are seldom performed at the Lahey Clinic. Naturally, it is impossible to achieve such excellent results, unless a perfect organization representing surgery, medicine, gastroenterology, laboratory and x-ray departments cooperates. Furthermore, the surgeon must have acquired a perfect technic for the duodenal resection. This type of surgical intervention cannot be performed by the general surgeon with a small gastric material. His mortality figures will be unduly high.

While some surgeons may attempt to defend the practice of leaving the ordinary chronic duodenal ulcer in situ, even the most convinced proponent of this method must admit that the situation is quite different in an ulcer complicated by uncontrollable hemorrhage. For reasons which will be demonstrated later, it is particularly in this type of case that the operative

Fig. 5.—Specimen showing a duodenal ulcer (*a*) on the posterior wall and a diverticulum (*b*) just beyond the pylorus (*c*).

experience acquired by the surgeon who habitually resects distal to the ulcer will prove its usefulness.

At present considerable confusion exists as to the natural course and therapeutic indications of bleeding duodenal ulcers. This is largely due to a failure to differentiate and classify properly the various types of bleeding that are encountered. The situation will be considerably clarified if hemorrhage due to duodenal ulcer is divided into three groups: (1) mild hemorrhage of an ulcer which stops spontaneously after only slight loss of blood and with a minimum of constitutional symptoms; (2) severe bleeding which stops after a few blood transfusions, and (3) uncontrollable hemorrhage which remains unaffected after a number of blood transfusions. Obviously if the first group, which constitutes a large proportion of all cases, is grouped with the other two, an erroneous concept as to the potential dangers of the severer types of bleeding

9. Marshall, S. F.: Recurrent Ulcer Resulting from Inadequate Gastric Resection, Lahey Clin. Bull. 4: 182, 1945.

may be acquired. Group 3 may be small in number as compared with group 1 or 2. However, group 3 represents one of the most serious problems in the treatment of ulcers. In 1943, for instance, 52 patients were admitted with bleeding duodenal ulcers to the medical wards of Mount Sinai Hospital. In 21 cases the bleeding was so mild that the patients recovered without a transfusion. Thirty-one patients received one or more transfusions. These 31 cases represent hemorrhage of groups 2 and 3. Four patients died. It should be noted that other authors have reported considerably higher mortality figures.

The mortality for severely bleeding ulcers would be even higher if those cases in which bleeding, though profuse, stops after a few transfusions were separated from those in which it continues after a number of transfusions. It is in this latter group that surgical procedures must supplant medical treatment, if the patient is to be saved. It is in this latter group that the mortality will be high unless, as Finsterer [10] pointed out, these patients are operated on before they are so hopelessly exsanguinated that the tissues have lost their recuperative power. It is in this latter group that supreme technical skill is needed in order to save the patient's life by a rapid gastric resection. The bleeding occurs in most cases in an ulcer situated on the posterior wall with an open vessel in the center of the ulcer. Transfixion or cauterization of the ulcer, as Rienhoff [6] has advised, often is technically impossible and may not prevent continuation of the hemorrhage with subsequent fatal issue. Attempts to tie off the afferent vessel will usually prove futile, as it is in most instances a branch of the pancreaticoduodenal artery which cannot be reached without prior removal of the duodenal ulcer.

In certain circles the opinion is apparently held that operation during the active stage of hemorrhage is practically always unwarranted. It is my opinion that a more aggressive attitude in the surgical treatment of bleeding duodenal ulcers will result in a lower mortality. Without such surgical intervention a number of patients in whom hemorrhage has not ceased after a series of transfusions will go on to a fatal issue. Age is not a definite criterion, though most of the fatal cases occur in the higher age groups (above 45).

SUMMARY

1. The term "partial gastrectomy for duodenal ulcer" should be used only when the gastric resection includes the removal of the duodenal ulcer.

2. If the duodenal ulcer is left in situ the operation should be classified as palliative resection.

3. The term "subtotal gastrectomy" implies that a small pouch of stomach remains after the gastric resection. It should never be used in describing gastric resection for duodenal ulcer, which does not remove more than one half or two thirds of the stomach.

4. In order to guarantee a complete removal of the pylorus and a safe closure of the duodenum, the resection should be carried below the ulcer.

5. I strongly advise against the technic which leaves the ulcer in situ. Such a procedure is apt to be followed by an increase in immediate postoperative complications and an increased incidence of jejunal ulcers.

6. Abdominal drainage is unnecessary and inadvisable in most cases. It indicates that the surgeon is not satisfied with the safety of the duodenal suture.

7. In most bleeding duodenal ulcers the hemorrhage stops spontaneously or after a few transfusions.

8. However, in a small percentage of these cases, partial gastrectomy must be employed as the only possible procedure in an attempt to save the life of the patient.

1155 Park Avenue.

10. Finsterer, H.: Surgical Treatment of Acute Profuse Gastric Hemorrhage, Surg., Gynec. & Obst. **69**: 291, 1939.

ABSTRACT OF DISCUSSION

DR. FRANK H. LAHEY, Boston: I agree with practically everything that Dr. Lewisohn has said. I should think that he would get a great deal of satisfaction in presenting this subject, particularly in view of the difficulties that he and several others in this country who were pioneers in advocating subtotal gastrectomy had in gaining the acceptance of subtotal gastrectomy. That was the period of debate in regard to the value of gastroenterostomy versus subtotal gastrectomy and the mortality of gastroenterostomy as compared with the mortality of subtotal gastrectomy. Surgeons are now on the threshold of another comparison, and that is a comparison of the results with the method of treating gastric and duodenal ulcer by vagotomy with those of subtotal gastrectomy. The comparison of the results of subtotal gastrectomy with those of vagotomy is at a very early stage. It will be interesting to observe whether these results are compared and reported with greater tolerance, justice and consideration than were the comparisons between gastroenterostomy and subtotal gastrectomy. During the period while subtotal gastrectomy was being put on probation its opponents became stirred up and not a little unfair. Not only was this attitude an injustice to the men who strongly urged subtotal gastrectomy at that time but I am sure that the results with gastroenterostomy were not reported as scientifically and as justly as they should have been. As a result of these experiences reports on results and comparisons between subtotal gastrectomy and vagotomy as a method of treating peptic ulcer will be made much more scientifically and much more justly than was the comparison between gastroenterostomy and subtotal gastrectomy. There are certain things about vagotomy that all will watch with interest. One is, as the result of the atony which occurs after vagotomy, how many of these vagotomized patients, particularly those with duodenal ulcer, which so frequently produces some degree of obstruction, will need later gastroenterostomy? Since vagotomy only temporarily lowers acidity, if gastroenterostomies have to be performed, how many gastrojejunal ulcers will later follow this procedure? When one realizes that extremely active duodenal ulcers cicatrize when healing and frequently produce some degree of obstruction, the combination of cicatrix plus atony can and probably will make it necessary to follow vagotomy later by an as yet unproved number of gastroenterostomies. Because of this uncertainty, my position and that of my associates has been that we will reserve vagotomy for those patients with complicated ulcers in whom we consider that an operation as yet unseasoned is justified in terms of risk, such as the patients who have had high subtotal gastrectomies and in whom recurrent jejunal ulcers have later developed. In these cases we would be quite willing to perform vagotomies, because in spite of the gastrojejunal ulcer they will, with a large stoma, drain even though atony occurs. As yet I do not want to perform many vagotomies for duodenal ulcers in relatively young persons when there is an other well proved operation, tested over the years, that gives reasonably good results; however, I do feel that vagotomy is a real contribution, and it is of value to have another method of approach. I hope it works because it is technically much easier on the surgeon than a subtotal gastrectomy for duodenal ulcer which has to be taken off the common duct. When one compares the mortality between gastric ulcer, duodenal ulcer and jejunal ulcer, all operated on by subtotal gastrectomy, as shown in our series (85 gastric ulcers—

no mortality, 358 duodenal ulcers—mortality 2.8 per cent, and 87 jejunal ulcers—mortality 2.3 per cent), it may be seen that the mortality is highest in subtotal gastrectomies for duodenal ulcers. This is due to the fact that so many of these ulcers are old, have become adherent to the common duct and have eroded into the head of the pancreas. What has this to do with gastroenterologists? I strongly urge that the patient with a chronic duodenal ulcer that has recurred frequently be submitted to operative intervention earlier than has often been the case in the past, before the erosion of the pancreas, cicatrization and adherence to the common duct have taken place. Many of these complications which produce the mortality with duodenal ulcer can then be technically avoided. We at the Lahey Clinic have demonstrated, I think, as have all men who do much gastric surgery, that subtotal gastrectomies can now be performed with relatively low mortality. We are seeking, all of us, to lower this mortality rate even more, and one method, particularly with the duodenal ulcers, by which this can be accomplished is their resection before they have become so cicatrized and have eroded so deeply into the pancreas.

GASTRIC OPERATIONS

Troublesome Postoperative Symptoms with Special Reference to Carbohydrate Ingestion

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There has been a tendency to consider gastric operations successful if a recurrent benign or malignant ulceration does not develop. While it has been recognized that after such procedures patients may have difficulty in regaining their preoperative weight and some may require treatment for a secondary anemia, it is doubtful if physicians at large have accepted the fact that 5 to 25 per cent of these patients have complaints which are related to the ingestion of food.[1] These symptoms may occur as a mild or severe attack which includes some or all of the following: sensations of warmth, sweating, dizziness, faintness, palpitation, nausea and abdominal pain. Extreme instances of syncope or convulsions are cited in the literature, whereas mild attacks may simulate hunger pains or the hot flushes of the menopause. Attacks may come on either immediately after eating or several hours later. A study of a group of patients who had had various types of gastric operations suggests that these symptoms are commoner than is generally realized and are related to a diet rich in carbohydrates.

The cause of this syndrome has been the subject of considerable speculation. In 1933 Lapp and Dibold[2] corroborated by Beckermann[3] called attention to the occurrence of spontaneous hypoglycemia with typical symptoms several hours after meals. They found that dextrose tolerance tests performed in patients who had had gastric operations showed abnormally steep curves, with the blood sugar rapidly rising to levels above normal and subsequently falling to below normal. Inasmuch as a similar curve could be produced by injecting solutions of dextrose directly into the jejunum, it was assumed that the alteration in the curve reflected an increase in the rate of absorption of the sugar rather than a change in sugar tolerance and that it was presumably due to more rapid delivery of the sugar into the jejunum. The treatment of patients subject to such attacks should obviously be aimed at supplying sugar in some form well before the onset of this alimentary hypoglycemia.

Glaessner pointed out in 1940[4] that alimentary hypoglycemia was not responsible for all the symptoms in these patients. He showed that a diametrically opposite condition, which he termed hyperglycemic shock, was present following the administration of dextrose or sucrose in certain patients after gastric resection. This was associated with "nausea, vomiting, lumbar pains, visual disturbances, convulsions and cardiac disturbances." It was his belief that the rapid absorption of dextrose or sucrose accounted for these symptoms and that the hypoglycemia was a delayed and secondary effect. He advocated the use of small doses of insulin before meals by patients who exhibited these symptoms.

Other investigators have expressed the view that there is no close correlation in these patients between the rate of sugar absorption and the symptoms. They believed the attacks to be the result of sudden, mechanical distention of the unprepared jejunum.[5] This has been called the dumping syndrome. Custer and associates[1a] described it as occurring suddenly, either during or immediately after a meal, and listed four cardinal symptoms: "(1) profound nausea and weakness, (2) a generalized and unpleasant sense of warmth throughout the body, (3) a cold diaphoresis of the face, particularly of the forehead, and (4) cardiac palpitation." They found the incidence of this syndrome to be 5 per cent and 12.5 per cent in two groups of patients who had had gastric resection for benign peptic ulcer. Since the majority of the patients had a resection of the Polya type, they were inclined to relate the syndrome to the large gastrojejunal stoma. They considered that prevention of this complication was logically directed at creating smaller stomas in the future (as in a Hoffmeister type of resection) to delay gastric emptying. They sought to slow down the emptying of the stomach by having the patients lie down immediately after meals, by giving ephedrine before meals and by the oral administration of dilute hydrochloric acid. Although these writers did not believe that the size and nature of the feeding were important factors, they stated that one fifth of these patients implicated sweets, carbohydrate-rich foods and milk as initiating the attacks.

Evenson[6] conducted a careful study of dextrose tolerance curves and gastric motility in normal controls, in patients with medically-treated gastric or duodenal ulcers, in patients with gastroenterostomy and in patients with gastric resection. He was able to reach the following conclusions: 1. Gastric motility and speed of emptying is increased in patients who

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From the Surgical Clinic of the Peter Bent Brigham Hospital, Boston.
Read before the Section on Gastro-Enterology and Proctology at the Ninety-Fifth Annual Session of the American Medical Association, San Francisco, July 3, 1946.

1. (a) Custer, M. D., Jr.; Butt, M. R., and Waugh, J. M.: The So-Called "Dumping Syndrome" After Subtotal Gastrectomy, Ann. Surg. **123**: 410-418, 1946. (b) Ingelfinger, F. J.: Late Effects of Total and Subtotal Gastrectomy, New England J. Med. **231**: 321-327, 1944. (c) Jordan, S. M.: End Results of Radical Surgery of the Gastrointestinal Tract, J. A. M. A. **116**: 586-590 (Feb. 15) 1941.

2. Lapp, F. W., and Dibold, H.: Blutzuckerablauf in seiner Beziehung zum Resezierten Magen, Klin. Wchnschr. **12**: 547-548, 1933.

3. Beckermann, F.: Ueber spontane Hypoglykämie nach Magenoperationen, Deutsche med. Wchnschr. **59**: 683-684, 1933.

4. Glaessner, C. L.: Hyperglycemic Shock, Rev. Gastroenterol. **7**: 528-533, 1940.

5. Schwartz, A.; Rheingold, I., and Necheles, E.: Investigation of the Relationship Between Blood Sugar and General Complaints Following Subtotal Gastric Resection, Am. J. Digest. Dis. **9**: 151-154, 1942. Custer, Butt and Waugh.[1a]

6. Evenson, O. K.: Alimentary Hypoglycemia After Stomach Operations and the Influence of Gastric Emptying on the Glucose-Tolerance Curve, Acta med. Scandinav., 1942, supp. 126, pp. 1-383; abstracted, Internat. Abstr. Surg. **81**: 108-113, 1945.

have had a gastric resection or a gastroenterostomy. 2. The dextrose tolerance curve is abnormal in the majority of patients with gastroenterostomy or gastric resection, showing a great and rapid primary rise and a subsequent rapid fall to low values. 3. The abnormal dextrose tolerance curves are the result of speedier absorption from the jejunum; this in turn is a consequence of rapid gastric emptying. In 1 case of unusual interest a gastroenterostomy of some years' standing was demounted, and normal gastroduodenal continuity was restored. With elimination of the gastroenterostomy, abnormal dextrose tolerance curves of the type referred to previously became normal, and the gastric emptying was found to be slowed.

TABLE 1.—*Sugar Absorption After Gastric Surgery*

Oral Dextrose Tolerance Tests

Blood Sugar Curve	No. of Patients
Both hypoglycemia and hyperglycemia	10
Hyperglycemia only	7
Hypoglycemia only	4
Neither hyperglycemia nor hypoglycemia	4
	25

Hyperglycemia greater than 250 mg. per hundred cubic centimeters
Hypoglycemia less than 65 mg. per hundred cubic centimeters

The present study of bizarre symptoms after gastric operations is based on a group of 25 patients, a number of whom were selected because they had complaints related to eating. Of the 25 patients, 15 had submitted to various surgical procedures for duodenal ulcer, including gastroenterostomy, Billroth I resection, Polya resection and radical fundusectomy. Five patients had marginal ulcers in a previous gastroenterostomy, and 3 of these had subsequent resection. Two patients had resection for gastric ulcers. Three patients had resection for carcinoma, including 1 total gastrectomy. There were 21 men and 4 women in the group, and their ages varied from 26 to 65 years. The elapsed time following the operative procedure varied and was over twenty years in some cases.

These patients were given 100 Gm. of dextrose orally after they had fasted, followed by blood sugar determinations at frequent intervals for about three hours. Any complaints which developed during the period of observation were noted, and their character, severity and duration recorded. Most patients had two or more tests. In a few cases test meals of high carbohydrate, high protein or high fat content were used as well. For purposes of analyzing the group as a whole, a curve was regarded as showing hyperglycemia if the blood sugar level exceeded 250 mg. per hundred cubic centimeters in an hour or less, and as hypoglycemia if the blood sugar dropped below 65 mg. per hundred cubic centimeters after the first hour.

TABLE 2.—*Sugar Absorption After Gastric Surgery*

Symptoms During Dextrose Tolerance Test in Patients with Peptic Ulcer

Symptoms	No. of Patients	Curve *
Both early and delayed	5	5 had hyperglycemia and hypoglycemia
Early only	8	6 had hyperglycemia
Delayed only	1	1 had hypoglycemia
No symptoms	8	
	22	

Hyperglycemia greater than 250 mg. per hundred cubic centimeters
Hypoglycemia less than 65 mg. per hundred cubic centimeters

* Includes only portion of curve associated with symptoms.

Ten of the patients had both hypoglycemia and hyperglycemia in one or more dextrose tolerance tests (table 1). Seven patients showed only hyperglycemia, while 4 showed only hypoglycemia. All but 4 patients in the entire group of 25 showed either hypoglycemia or hyperglycemia, or both, in one or more dextrose tolerance tests. This is in accord with the observations of others previously referred to, that abnormal curves are to be expected in this type of patient.

An analysis of the 22 patients with peptic ulcer (table 2) shows that 14 had some type of complaint, exclusive of a feeling of fulness or drowsiness, in the course of the dextrose tolerance test. Furthermore, in all but 2 of the 14 there were corresponding abnormalities in the blood sugar level. It should be emphasized, however, that the time of the complaint did not necessarily coincide with the extremes of the blood sugar level. Early symptoms frequently appeared before the greatest peak, and late symptoms in several cases lagged behind the first drop to hypoglycemic levels. Patients experiencing discomfort both early and late in the test invariably were asymptomatic in the interval.

TABLE 3.—*Sugar Absorption After Gastric Surgery*

Correlation of Clinical Symptoms with Dextrose Tolerance Test in Patients with Peptic Ulcer

No. of Patients	Complaint on Follow-Up	Dextrose Tolerance Test	
4	Symptoms within 30 minutes of eating	Early symptoms	4 -
		Hyperglycemia	3 *
6	Symptoms delayed an hour or more after eating	Delayed symptoms	3 †
		Hypoglycemia	5 †

Hyperglycemia greater than 250 mg. per hundred cubic centimeters
Hypoglycemia less than 65 mg. per hundred cubic centimeters

* Does not include late phase of test.
† Does not include early phase of test.

Ten of the 22 patients with peptic ulcer gave a history of postoperative discomfort, which could reasonably be interpreted as of the type considered in this study (table 3). These symptoms are more frequently associated with breakfast than any other meal. The 10 patients can be divided into two groups: in one the symptoms appeared shortly after eating; in the other they came on after a latent period of one hour or longer. Table 3 demonstrates a fairly good correlation between the clinical complaints and the results of the dextrose tolerance test.

Certain features of the study may be brought out best by representative protocols. Chart 1 represents a patient who had a Billroth I resection. It shows that abnormal absorption of sugar and untoward symptoms do not depend on a direct connection between the stomach and jejunum. This is indirect evidence against the theory that sudden jejunal distention is the principal cause of symptoms. Chart 2 also demonstrates that symptoms may develop both shortly after the ingestion of sugar and after a latent interval. It indicates that abnormal absorption of sugar may persist for many years. Such abnormally rapid absorption is not restricted to patients who have been operated on for peptic ulcer. Chart 3 shows a steep curve, which represents the blood sugar levels following a high carbohydrate meal in a patient who had a total gastrec-

tomy for carcinoma eight years previously. This observation has been made by others.[7] Charts 3 and 4 illustrate that individual susceptibility must play some role in the production of symptoms, since both show extremely steep curves with decided hyperglycemia but no reaction beyond sleepiness. Chart 5 shows the converse, because this patient showed early symptoms with the dextrose tolerance test although the blood sugar never rose to high levels. This patient learned to avoid sweets shortly after operation and was thus able to keep himself symptom-free in his daily life. Chart 6 represents an extremely susceptible patient who had learned to regulate his diet by avoiding sweets and eating frequent small meals. Note that the blood sugar levels after a meal rich in fats or proteins were little more than half of those following a carbohydrate meal. This emphasized the practical value to this patient of avoiding food with a high carbohydrate content.

COMMENT

There appear to be two distinct syndromes following gastric surgery which must be differentiated: one appearing shortly after the ingestion of food, the other

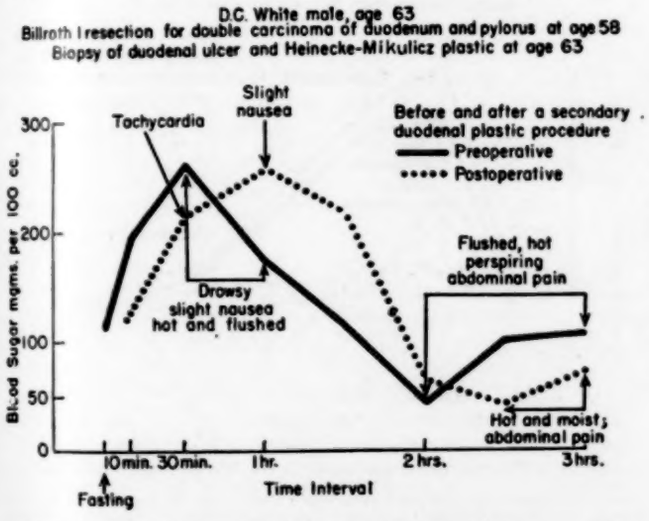

Chart 1.—Oral dextrose tolerance tests (100 Gm.) five years postoperatively. This patient showed symptoms both early and late after dextrose meals. He eats three meals daily, but has occasional mild epigastric pain which comes on several hours after meals and which is relieved by milk. Gastrointestinal roentgen examination shows no evidence of ulcer.

occurring after a latent period of one hour or longer. Both types have been shown to occur in the same person. There can be little doubt that delayed symptoms are due in most instances to a demonstrable hypoglycemia.

The cause and control of the other syndromes leave more room for disagreement. Hyperglycemia without regard to the rate of sugar absorption can hardly be the entire explanation, since a moderately elevated blood sugar level is well tolerated by many patients with diabetes. Furthermore, in a number of our cases the onset of symptoms preceded the rise of the blood sugar to its maximum level.

On the other hand, there are several important reasons why simple, sudden, mechanical distention of the jejunum is not a satisfactory explanation. Experimental work with distention of balloons at various

7. Farris, J. M.; Ransom, H. K., and Coller, F. A.: Total Gastrectomy: Effects upon Nutrition and Hematopoiesis, Surgery **13**: 823-833, 1943.

levels in the gastrointestinal tract has failed to evoke symptoms comparable to the ones under consideration; this includes sudden distention of the upper part of the jejunum.[8] The syndrome has been shown to occur in patients who have no short-circuit from the stomach to the jejunum (as in a Billroth I resection). Finally,

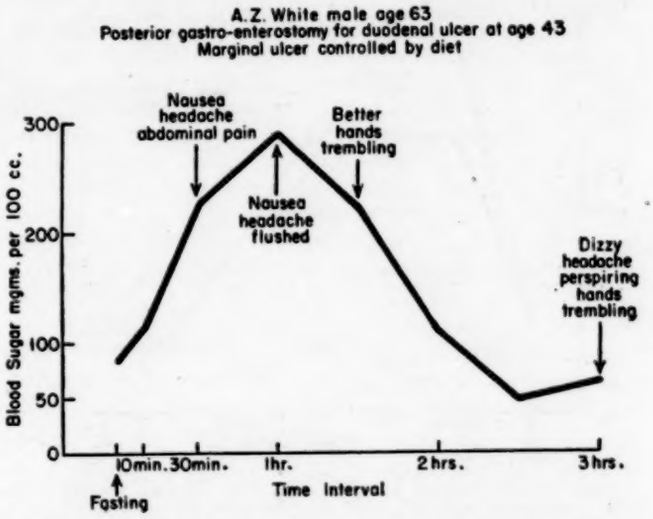

Chart 2.—An oral dextrose tolerance test (100 Gm.) twenty years postoperatively exhibited an abnormal curve, in a patient with an intermittently active marginal ulcer. He experienced symptoms both in the hyperglycemic and hypoglycemic phases of the curve, with a symptom-free period between.

patients themselves notice the influence of different types of food and avoid concentrated sweets. The different effects can be observed in the same patient by the use of test meals rich in fat, protein or carbohydrates, as illustrated in chart 6.

Whatever the exact mechanism, one may postulate a contributory role played by several different factors: (1) increased gastric motility (a relatively constant

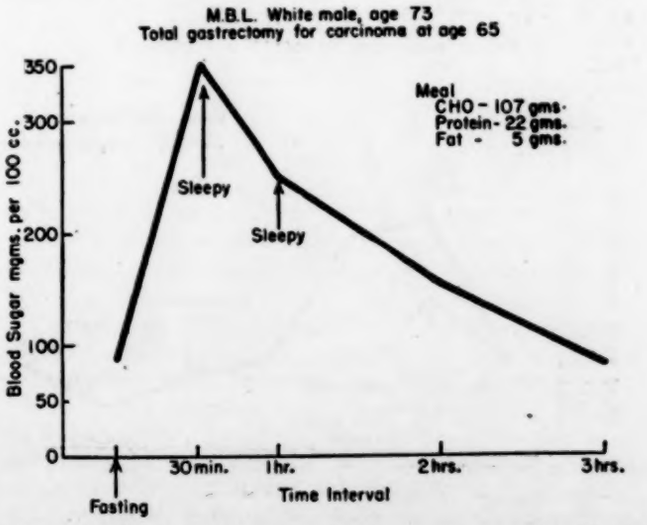

Chart 3.—High carbohydrate test meal eight years postoperatively: Drowsiness was the only symptom in a decidedly abrupt and pronounced hyperglycemia. This patient eats three full meals daily and has no digestive complaints.

finding); (2) an abnormally rapid delivery of food into the jejunum, usually aided by a short-circuit around the duodenum; (3) failure of normal dilution of hypertonic solutions of sugar in the stomach as a result of the first two factors mentioned; (4) abnormally rapid

8. Devine, J.: Personal communication to the authors.

absorption of sugar from the jejunum as the result of hypertonic solutions and a larger delivery of food than normal; (5) possible effects of distention of the jejunum by direct irritation of the mucosa by undiluted food, and (6) the susceptibility of the individual patient.

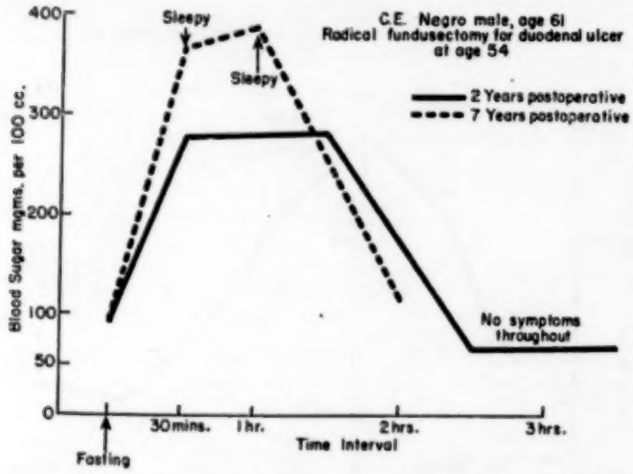

Chart 4.—Oral dextrose tolerance tests: This patient is a stolid Negro who experienced nothing beyond drowsiness despite a decided hyperglycemia. He eats three full meals daily and has no digestive complaints but spontaneously avoids sweets and meats.

If various factors play a role, an attack on any one of them may help to alleviate symptoms. Thus, it is entirely logical to attempt to slow down gastric emptying by any means available, since this is bound to affect the other factors mentioned. Since this may be difficult to accomplish, it is also reasonable to reduce the carbohydrate content and concentration of the feedings in an effort to slow down the rate of absorption of sugar and the possible irritative action on the jejunum.

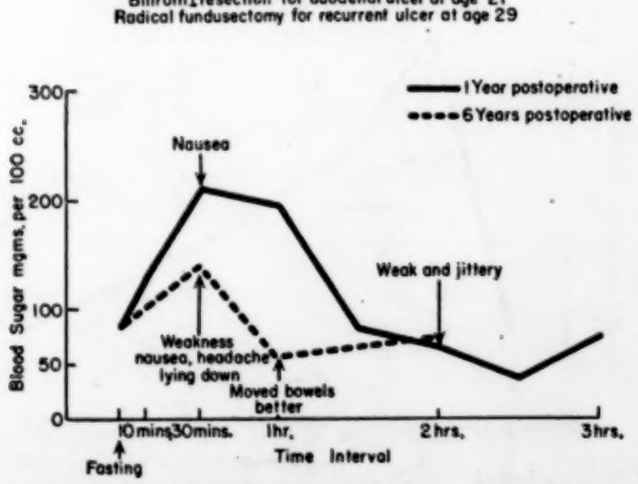

Chart 5.—Delayed hypoglycemia is shown in two oral dextrose tolerance tests (100 Gm.) five years apart, in a patient who experienced both early and delayed symptoms. This patient eats three full meals daily and has no digestive complaints, but he found out shortly after operation that he could not eat excessive sweets, pastries or custards and was nauseated by milk; consequently he avoids these foods because of their immediate rather than their delayed effect.

SUMMARY AND CONCLUSIONS

1. The present study confirms the belief that abnormal sugar absorption takes place in many patients who have had gastric operations. This abnormality consists of a rapid rise of blood sugar to high levels and a precipitous fall, often to hypoglycemic levels.

2. This phenomenon may be observed after a variety of gastric procedures, both for ulcer and for carcinoma, and may persist for years.

3. Unpleasant symptoms may occur shortly after the ingestion of a meal rich in carbohydrates, which is the hyperglycemic phase, or after several hours—the hypoglycemic phase.

4. The intensity of these reactions depends on the given patient's susceptibility.

5. Although the mechanism involved in the production of early symptoms is not yet clearly understood, smaller and more frequent feedings, with calories derived from fat or protein, are suggested as one means of controlling the symptoms. This is in accord with the observation that many patients who have had gastric operations appear unable to tolerate concentrated sweets well and tend to avoid them spontaneously. Test meals low in carbohydrates evoke reactions of lesser degree in susceptible patients.

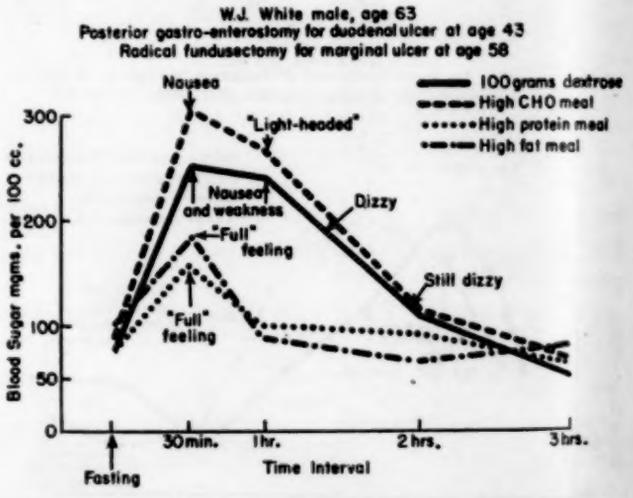

Chart 6.—Test meals five years postoperatively were given on successive days and, except for the dextrose meal, were of equivalent bulk. The sharpest and most prolonged reaction came from the dextrose meal; the high protein and high fat meals, by way of contrast, gave the patient only a feeling of fulness, the same feeling which prevents his eating a complete meal.

6. The patient who has symptoms several hours after eating may require food to combat hypoglycemia.

7. It is believed that many patients who have submitted to gastric surgery can be benefited by the regulation of their carbohydrate intake.

ABSTRACT OF DISCUSSION

Dr. H. Glenn Bell, San Francisco: The question arose in reading this paper, whether Drs. Zollinger and Hoerr have a different type of patient in the East than we have in San Francisco. I have not seen the severe reactions that he has described. I have seen some of the milder symptoms. They come on early in the postoperative course and may last for several months. It has been the practice to advise these patients that they should eat frequently and in small amounts. Symptoms have been explained as resulting from the dumping effect of the stomach directly into the upper jejunum, with a sudden dilatation of the jejunum. The study with the balloons in the gastrointestinal tract tends to discredit this idea. Tactfully, however, it does work. Since all patients are followed indefinitely, it is observed that these symptoms tend to disappear in a few months. There are patients who have an idiosyncrasy

for carbohydrates, particularly sugar, and so I have met patients of this type who have other surgical conditions outside of the gastrointestinal tract. When the surgeon tries to build these patients up with a high carbohydrate diet preparatory for surgical intervention, they say that they cannot take carbohydrates because they become nauseated, and some of them actually will vomit. If this same condition is present in a patient who had to have a gastric resection, I can see where they might have added postoperative difficulty.

DR. SIDNEY A. PORTIS, Chicago: I could not follow Dr. Zollinger's line of thought when he was talking about the question of hyperglycemia and hypoglycemia in the same breath. In the early symptoms of this clinical condition, I don't think the question of hyperglycemia is involved at all. I consider the symptoms entirely due to a disturbed physiologic balance, which is associated with rapid emptying of the stomach and overdistention of the small intestine. I can, however, go along with him on the question of hypoglycemia. I reported in this section in 1944 that I thought there was a definite relation between the pain in ulcer and the levels of sugar in the blood. The pain which came on one to three hours after eating may be associated with a hypoglycemic phase. This also may account for the early morning pain long after the intake of food. This hypoglycemic phase can be completely abolished by the use of atropine and frequent feedings, particularly if atropine is given before bedtime. Vagotomy, as has been reported, completely abolishes the insulin response and does, from a surgical point of view, what one pharmacologically attempts to do with atropine. In 1944 I published a diet for an ulcer patient which was devoid of free sugar but allowed complex carbohydrates to remain in the diet. The explanation for the avoidance of free sugar was given at that time and needs no repetition here. The postdigestive hyperinsulinism with an intact parasympathetic nervous system can produce a hyperacidity, which may be responsible for the symptoms of which the ulcer patient complains.

DR. ASHER WINKELSTEIN, New York: During the past twenty-five years there has been conducted a careful follow-up of the patients who have had a subtotal gastrectomy for peptic ulcer at the Mount Sinai Hospital. The postoperative symptomatology has been studied in four groups of symptoms after subtotal gastrectomy has been encountered. The first group is the group with recurrent ulcer (proved roentgenologically) and the presence of free hydrochloric acid. The second group has ulcer-like symptoms, including occasional hemorrhage, without free acid and with negative roentgenologic observations. In this group the symptoms are probably due to gastritis with erosions. A third group has symptoms which are chiefly intestinal. They have abdominal distention, cramplike pains, constipation and, rarely, diarrhea. In this group the symptoms are probably due to the dumping action, which is frequently cited as the explanation of all except ulcer symptoms after subtotal gastrectomy. The fourth is the group on which Dr. Zollinger has so ably reported. This group consists of patients who have dizziness, faintness, perspiration and weakness, usually occurring within the first hour after a meal. These patients learn to help themselves in two ways: (1) they eat solids at the beginning of the meal and (2) they restrict their dextrose intake. The late Dr. Glaessner studied with me in my gastrointestinal clinic a series of patients who had these symptoms after meals. We gave them 300 cc. of 50 per cent dextrose and studied the blood sugar curve every fifteen minutes for the next three hours. In the patients who had had symptoms spontaneously there also developed symptoms after the intake of this sugar at the time when there was a marked hyperglycemia. The patients often had blood sugar levels of 250 to 400 mg. per hundred cubic centimeters. This was characterized as hyperglycemic shock. Often, in addition to the dizziness, perspiration and faintness of these patients, mental symptoms developed. They became loquacious, disoriented and in some cases had alternate spells of laughing and crying. The neurologists may be interested in studying this hyperglycemic reaction in relation to the hypoglycemia which they institute in the therapy of certain mental diseases.

MODERN PHYSIOLOGIC CONCEPTS

Their Application to the Treatment of Disease of the Liver

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Rochester, Minn.

Treatment of hepatic disease until recent years was largely symptomatic. Diets low in all constituents were prescribed to spare the diseased liver as much as possible. As ascites was often the first clinical manifestation of chronic hepatic disease, the attack was primarily against this by means of purges, restriction of fluid and salt and, in more recent times, the administration of acid-forming salts and organic mercurial diuretics. Undoubtedly much damage was done by the enthusiastic therapeutist. Little attention was given to methods of supporting the liver, and little was known of the factors leading to ascites. In the twenties attention began to be directed to the condition of the liver based on new knowledge of its physiology and the experimental production of hepatic disease. Since then progressive changes in therapeutic practice have occurred. Results remain difficult to evaluate, but a scientific clinical approach has been developed.

In an attempt at orientation in current conceptions of hepatic therapeutics the subject may be conveniently considered under the following headings: (1) current concepts of hepatic physiology; (2) experimental production of hepatic disease; (3) results of application of new data to clinical practice, and (4) criteria for evaluation of results of this application.

CURRENT CONCEPTS OF PHYSIOLOGY OF THE LIVER

The liver, which is the largest organ in the body, possesses remarkable reserve and regenerative capacity. Removal of 80 per cent of the organ in animals leaves a portion adequate to carry on necessary functions, and the liver rapidly regenerates. It regains normal size in six to eight weeks. The polygonal cell is the characteristic cell of the liver. The functions of the liver largely depend on this cell, which is the site of injury in pathologic processes. Each cell performs specific functions as part of the organ in addition to its own basic protoplasmic functions. The functions of the liver are many (more numerous than those of any other organized tissue) but they may be grouped under a few headings; namely, production of bile, detoxification and participation in general metabolism. While these functions of the liver are interrelated, nevertheless the seriousness of hepatic disease depends principally on the degree of impairment of its metabolic activities.

Carbohydrate Metabolism.—The liver stores ingested carbohydrate as glycogen, an easily available source of energy, though the amount stored varies greatly. Starvation rapidly depletes the stores of glycogen, but the liver seldom is devoid of it. On the other hand, as much as 20 per cent of the weight of the liver may be glycogen. When such an amount is present, it causes impairment of some of the functions of the liver. In addition to monosaccharides, glycogen may be formed from lactic acid produced in the muscles, from protein and from the glyceride of fat. This transformation

From the Division of Medicine, Mayo Clinic.

Read in a symposium on "Diseases of the Liver" before the joint meeting of the Section on Gastro-Enterology and Proctology and the Section on Pathology and Physiology at the Ninety-Fifth Annual Session of the American Medical Association, San Francisco, July 5, 1946.

This paper and the succeeding papers by Dr. Osgood, Drs. Giansiracusa and Althausen, Dr. Capps, Captain Sborov and Dr. Barker, and Dr. Wilbur are part of a symposium of eleven papers on "Diseases of the Liver." The other six papers in the symposium will be published in THE JOURNAL next week.

occurs chiefly if not wholly in the liver and is particularly prominent in carbohydrate starvation. When adequate carbohydrate is available, protein will not be called on to supply carbohydrate for fuel. This function is known as "the protein sparing function of carbohydrate." When excess glucose is available, it is converted to fat and is deposited in the fat depots. There is no evidence that the reverse is true: namely, that fat is converted to glucose when the supplies of the latter are low. Under this condition fat will be mobilized and partly broken down by the liver to ketone bodies. Carbohydrate inhibits this breakdown (antiketogenic activity).

The liver converts glycogen to glucose to maintain a certain level of glucose in the blood and to supply the needs of body tissues. This regulation of blood sugar is an important function of the liver, although it is modified by many substances and processes of a fundamental nature, such as the endocrine factors. Thus, the liver stores glycogen when the blood sugar is increased after ingestion, and reconverts glycogen to glucose when the body requires it. In other words, the glycogen stores are mobile.

Removal of the liver in animals produces a characteristic train of symptoms accompanied by a progressive hypoglycemia. Dextrose is specific for these manifestations, but the administration of increasing amounts, up to 1 Gm. per kilogram of body weight per hour, is required. Then another group of symptoms leading to death of the animal appears; for these the administration of dextrose is of no avail, and as yet no explanation for their occurrence is known.

Glucose furnishes glucuronic acid for conjugation with phenol derivatives and acetyl groups for acetylation of para-aminobenzoic acid and sulfanilamide. The rate of these processes of detoxification is based on the concentration of glycogen in the liver. The glycogen stores in the liver are decreased by various toxic agents, such as chloroform, and anoxemia and deposition of fat follow. Livers with adequate stores of glycogen are less susceptible to these toxins. Animals with a damaged liver require a higher level of blood sugar than normal animals before glycogen will be stored. Amounts of dextrose that will maintain the blood sugar at normal levels in a hepatectomized animal will not cause a damaged liver to store glycogen.

Protein Metabolism.—The products of protein digestion come to the liver as amino acids, which are worked over and from which new proteins required for the maintenance of tissues and normal growth are formed. The liver is concerned in the elaboration and maintenance of the plasma proteins, among which are albumin, globulin, fibrinogen and prothrombin. A portion of the newly synthesized protein is stored in the liver and is extremely labile. It can be mobilized more quickly and can be utilized more easily than proteins of other tissues. The liver appears to regulate the supply of proteins to the tissues by regulation of the plasma proteins. Protein is also necessary for the formation of cholic acid, and certain proteins accelerate its formation. The liver is the major site of deamination; the nitrogenous portion of the amino-acid molecule is converted to urea and excreted; the remainder of the molecule is metabolized as d-glucose and fat.

Fasting decreases the protein content of the liver, and fat is deposited; if fasting is long continued, hypoalbuminemia develops. In disease of the liver the level of the serum albumin is often considerably lowered, the concentration of serum fibrinogen is decreased and the formation of prothrombin is affected. These changes apparently result from decreased ability of the liver to fabricate these proteins. A liberal protein diet, which insures adequate stores of labile protein in the liver, protects the organ from the effects of various toxins, such as chloroform, carbon tetrachloride, arsenic and selenium. That this is not due to the formation of glycogen from protein is indicated by the fact that a liver high in glycogen and fat but low in protein is susceptible to injury from chloroform. How protection is afforded is uncertain. According to one theory sulfur is readily available in certain amino acids for combination with toxins; another theory states that protection is due to the lipotropic effects of amino acids. There is some evidence that the quality of proteins is important. Observations on dogs with Eck fistulas have shown that meat or its extractives produce intoxication, whereas milk, bread and cereals do not. Bollman and Mann [1] have shown on dogs with cirrhosis secondary to obstruction or to administration of carbon tetrachloride that substitution of meat for a carbohydrate diet led to the formation of ascites.

Metabolism of Fat.—Fat circulates in the blood as neutral fat (glyceride), phospholipids and cholesterol esters and exists in the liver in these forms. It originates from the ingestion of fat, mobilization from the depots and synthesis of fat by the liver from carbohydrate and protein. The liver harbors fat in varying amounts but is not a storehouse for fat. Fat is constantly being mobilized to the liver, worked over and moved out. Phosphorylation is an important part of this metabolic process and, although the phospholipid content of the liver varies little normally, the rate of phospholipid turnover does vary. In the liver there may be rearrangement of the fatty acids in the molecules and there may be limited shortening or lengthening of the fatty acid chain and introduction of double bonds into saturated chains. The liver also is the principal if not the only site of formation of ketone bodies.

The amount of fat in the liver is fairly constant when the intake of carbohydrate and protein is adequate; it averages from 2 to 4 per cent of the weight of the liver. On hunger the liver gives up fat, but the fat content is constantly replenished from the fat depots. Under certain conditions 50 per cent of the liver by weight may be fat, and this condition produces impairment of some hepatic functions. A liver containing increased amounts of fat is particularly susceptible to the effects of hepatic toxins. Although a liver which is high in glycogen stores is resistant to these toxins, one in which stores of both glycogen and fat are high is susceptible. Increase in the rate that fat is supplied to the liver occurs during ingestion of a high fat diet, during starvation and after the administration of the antiketogenic fraction of the anterior part of the pituitary. Decrease in the rate at which the liver disposes of fat occurs as a result of the action of various toxins, such as halogenated hydrocarbons and phosphorus, feedings of cholesterol, pancreatectomy and deficiency of choline. Experimentally fatty livers have been produced by these and other means. They differ somewhat in response to lipotropic agents and possibly in the type of the fat. In the human being, pathologic accumulations of fat occur particularly in the so-called alcoholic fatty liver. Though few analyses of the fat in the liver

1. Bollman, J. L., and Mann, F. C.: The Physiology of the Impaired Liver, Ergebn. d. Physiol. **38**: 445-492, 1936.

have been made in human beings, such evidence as is available indicates that the increase is chiefly in the neutral fat fraction.

Lipotropic Factors.—A lipotropic substance is one which prevents the deposition of fat in the liver or increases the rate of its removal. The term lipotropic substance was originally applied to lecithin and its effect in preventing the fatty infiltration of the liver of depancreatized dogs which were being maintained on insulin. Choline was later shown to be the constituent of lecithin that was active in this respect. Other agents with lipotropic action have been identified: lipocaic, inositol and certain amino acids.

Choline participates in a reversible transmethylation process. It furnishes a methyl group for homocystine, which originates in the diet or is present in the tissues from previous demethylation of methionine, to synthesize methionine. On the other hand choline is formed from nitrogenous precursors, such as amino-ethanol, amino-acetic acid and betaine, by the addition of a methyl group supplied by methionine. Thus both choline and methionine contribute methyl groups in these metabolic processes. Some of these methyl groups go to the formation of creatine and are then lost to the bodily metabolic economy. Though choline can be synthesized, there seldom is a deficiency of it, as it is supplied in the diet as free choline or phospholipids. Choline deficiency may be interpreted in broader terms; namely, as an inadequate supply of methyl groups. The lipotropic action of methionine is indirect: it supplies methyl groups for the synthesis of choline; and protein is lipotropic through its methionine content.

The lipotropic action of choline is due to its promotion of synthesis of phospholipid in the liver as well as in the intestine. This synthesis is necessary for the transportation of fat from the liver, and the effect is chiefly on the neutral fat fraction. The methyl groups apparently are not necessary for, and do not take an active part in, the process of phosphorylation; the whole molecule participates as a unit.

Vitamins.—The liver is intimately associated with the metabolism of vitamins. In disease of the liver this power may be disturbed by failure of proper absorption, failure of storage in the liver and defects in intermediary metabolism. Jaundice with deficiency of bile salts in the intestine gives rise to failure of adequate absorption of the fat-soluble vitamins. Though vitamin A is absorbed, carotene is not. The liver is the only important site of conversion of carotene to vitamin A, and it stores vitamin A. Moreover, the stores can be depleted rapidly. In cirrhosis the vitamin A content of the liver is only 10 per cent of normal. The defective dark adaptation of cirrhosis is little benefited by the administration of vitamin A. Vitamin D also is largely stored in the liver, and this storage can occur in the presence of jaundice if vitamin D is given parenterally. However, the action of vitamin D is less efficient in the presence of hepatic disease than at other times. Osteoporosis may occur in cirrhosis, but vitamin D is not effective in its control. Vitamin K is necessary for the formation of prothrombin by the liver. A deficiency of vitamin K may arise from inadequate absorption, as in acholia. However, numerous water-soluble analogues are available and can be used when a deficiency arises, with excellent results. Faulty utilization of vitamin K occurs when hepatic damage is sufficiently extensive. The liver is rich in known and unknown factors of the vitamin B complex, acting as a storehouse for these substances. Several of these play an important part in the oxidation of carbohydrate and also in the synthesis of fat from carbohydrate and protein by participation in enzyme systems. Extra intake of carbohydrate may exhaust these, and this suggests the advisability of an extra intake of the vitamin B components when large amounts of carbohydrates have been given. Neuritis and pellagra have been reported in varying frequency in cirrhosis, but it is uncertain how much the disease of the liver may contribute to the production of these deficiencies. Fundamentally, the disturbances of metabolism of vitamins in hepatic disease are intrinsic; failure of intake and absorption are secondary influences. The changes induced as a rule are little influenced by administration of the vitamins.

The liver is a storage depot for the erythrocyte maturing factor. There is some evidence that the amount of this factor stored in chronic disease of the liver is decreased. How significant this is in the development and treatment of macrocytic anemia in cirrhosis is uncertain.

Ascites.—Ascites develops frequently in both acute and chronic liver disease, and the explanation for the process is not clear. Portal hypertension has long been considered the most important causative factor. The presence of portal hypertension, however, cannot be demonstrated in all cases. Lowering of the serum proteins, disproportionate decrease in the serum colloid osmotic pressure, dietary factors, disturbance of ability of the liver to handle water and altered permeability of capillaries are other important influences in the occurrence of this manifestation. Because of some of these factors much has been written concerning the oral or intravenous use of various protein hydrolysates for the control of ascites. Theoretically, permanent benefit will come only when the liver has recovered sufficiently to maintain adequate concentration of proteins in the plasma.

More recently, Ralli and associates [2] have reported the presence of increased amounts of an antidiuretic substance, apparently produced by the hypophysis, in the urine in cases of hepatic disease with ascites. The diseased liver apparently fails to destroy this antidiuretic substance. With improvement in the function of the liver, destruction of this substance is accomplished and spontaneous diuresis occurs. Confirmation of this work will be awaited with interest.

EXPERIMENTAL PRODUCTION OF HEPATIC DISEASE

It is well known that a variety of agents are capable of producing degeneration and necrosis of liver cells. The continued or repeated action of these agents leads to the development of changes characteristic of cirrhosis; namely, degeneration, necrosis and regeneration of cells and proliferation of fibrous tissue. Fatty livers and eventually cirrhosis develop in dogs after pancreatectomy and maintenance with insulin. In recent years emphasis on the relation of nutrition to the production of experimental cirrhosis has been increased. Patek and Post [3] suggested that there may be a correlation

2. Ralli, E. P.; Robson, J. S.; Clarke, D., and Hoagland, C. L.: Factors Influencing Ascites in Patients with Cirrhosis of the Liver, J. Clin. Investigation **24**: 316-325 (May) 1945.

3. Patek, A. J., Jr., and Post, J.: Treatment of Cirrhosis of the Liver by a Nutritious Diet and Supplements Rich in Vitamin B Complex, J. Clin. Investigation **20**: 481-505 (Sept.) 1941.

between the dietary deficiency encountered in alcoholism and cirrhosis. Connor [4] emphasized the importance of fatty livers in the development of cirrhosis in diabetes and in chronic alcoholism. He and his associate [5] found support for this hypothesis in the production of cirrhosis in dogs by a high fat diet and the administration of alcohol and by the feeding of a high fat diet alone. György and Goldblatt [6] observed hepatic injury in young rats kept on a diet devoid of a portion of the vitamin B complex. Rich and Hamilton [7] produced cirrhosis in rats, as did Spellberg and Keeton [8] in guinea pigs and rabbits, on a nutritional basis. From the various studies it is evident that diets moderately high or high in fat, low in protein and deficient in choline will produce changes in the liver. These can be prevented by the administration of choline and yeast, choline and cystine or choline alone. Extra cystine in the diets of rats has accentuated the development of cirrhosis. Lillie, Daft and Sebrell [9] produced cirrhosis in rats by low protein, low fat, choline-deficient diets with cystine added. Cirrhotic changes were prevented by the administration of choline, casein and methionine singly or in combination; their prevention can be explained on the basis of the lipotropic action of the supplements given. Most work has indicated that cystine aggravated the hepatic changes, particularly necrosis, which was often accompanied by hemorrhages. Hemorrhages also were encountered in the kidneys of young rats. György,[10] however, stated that choline was more effective from a protective point of view when cystine was also given. He pointed out that in experimental studies in which choline alone prevented hepatic injury the diets contained a certain amount of cystine.

Although choline prevents infiltration of the liver with fat from high fat-low protein feeding, it only partially prevents the changes induced by cholesterol feeding or by the administration of pituitary extracts. Lipocaic and possibly inositol apparently are more effective in the prevention of hepatic changes under these circumstances, though this is still subject to discussion. Choline has little effect in preventing lipoid deposition in the liver on injury from chloroform or carbon tetrachloride but does increase the rate of disappearance of fat during recovery. Once cirrhosis has been produced by these dietary methods, choline and methionine supplements aid regeneration of the liver cells, but the fibrosis is unaffected. Cirrhotic livers produced by diet are characterized by the presence in the phagocytic cells of ceroid, which does not disappear on recovery following high protein diet or administration of methionine and choline supplements. It has not been observed in cirrhotic livers of human beings. These dietary experiments are essentially of two types: (1) short term, in which fatty livers are prevented or are corrected by doses of choline and methionine and (2) long term, in which cirrhosis also results, and in which the fibrosis is not cured by the lipotropic agents.

RESULTS OF APPLICATION OF NEW DATA TO CLINICAL PRACTICE

The modern physiologic concepts previously mentioned, on which present-day practice is based, indicate that a liver which contains adequate stores of glycogen, protein and vitamins and normal amounts of fat, and which can maintain these stores because the intake of essential food is sufficient manifests the greatest resistance to toxins. Furthermore, these concepts indicate that after hepatic disease is established an increased intake of carbohydrate and protein is necessary to maintain the stores in the liver and to promote regeneration. The experiments of Opie and Alford [11] in 1914 led to the application of a high carbohydrate diet in clinical practice. The work of Ravdin and Whipple and their co-workers [12] led to the use of increased amounts of protein. Excessive deposition of fat appears characteristic of many hepatic diseases and increases the susceptibility of the liver to further injury. The advisability of a low intake of fat is not settled. A diet low in fat is difficult to prepare in an appetizing manner that will appeal to the patient, who often has anorexia and even nausea. A diet low in fat tends to be low in calories, fat-soluble vitamins and essential unsaturated fatty acids. Furthermore, there is no good evidence that moderate amounts or even large amounts of fat in the diet are harmful if given with adequate protein and carbohydrate.

In the application of the physiologic data to hepatotherapy an evolutionary process has been noticeable first, in the institution of a high carbohydrate intake and then, in the addition of protein to the diet, at first in moderate amounts and then in large amounts. Later supplementary vitamins, yeast and extract of liver were added to the diet, and finally the lipotropic agents, choline and methionine. The fundamental principle in treatment has been and still is the administration of these diets. It is essential that the food prescribed be eaten. Secondary considerations occur when patients cannot take adequate amounts of the food or when specific results are desired. Thus, tube feeding and intravenous infusions of dextrose, preparations of amino acids, plasma, serum or whole blood, as well as the various dietary supplements have been used. Numerous papers have been published on the results of the use of these programs in hepatitis and cirrhosis. In 1936 Jones [13] reported decided lowering of the mortality rate in 32 cases of hepatic insufficiency following the use of a high carbohydrate diet which was frequently supple-

4. Connor, C. L.: Fatty Infiltration of the Liver and the Development of Cirrhosis in Diabetes and Chronic Alcoholism, Am. J. Path. **14:** 347-364 (May) 1938.

5. Chaikoff, I. L., and Connor, C. L.: Production of Cirrhosis of the Liver of the Normal Dog by High Fat Diets, Proc. Soc. Exper. Biol. & Med. **43:** 638-641 (April) 1940.

6. György, P., and Goldblatt, H.: Experimental Production of Dietary Liver Injury (Necrosis, Cirrhosis) in Rats, Proc. Soc. Exper. Biol. & Med. **46:** 492-494 (March) 1941.

7. Rich, A. R., and Hamilton, J. D.: The Experimental Production of Cirrhosis of the Liver by Means of a Deficient Diet, Bull. Johns Hopkins Hosp. **66:** 185-198 (March) 1940.

8. Spellberg, M. A., and Keeton, R. W.: The Production of Fatty and Fibrotic Livers in Guinea Pigs and Rabbits by Seemingly Adequate Diets, Am. J. M. Sc. **200:** 688-697 (Nov.) 1940.

9. Lillie, R. D.; Daft, F. S., and Sebrell, W. H., Jr.: Cirrhosis of the Liver in Rats on a Deficient Diet and the Effect of Alcohol, Pub. Health Rep. **56:** 1255-1258 (June 13) 1941. Daft, F. S.; Sebrell, W. H., and Lillie, R. D.: Production and Apparent Prevention of a Dietary Liver Cirrhosis in Rats, Proc. Soc. Exper. Biol. & Med. **48:** 228-229 (Oct.) 1941.

10. György, P.: Experimental Hepatic Injury, Am. J. Clin. Path. **14:** 67-88 (Feb.) 1944.

11. Opie, E. L., and Alford, L. B.: The Influence of Diet on Hepatic Necrosis and Toxicity of Chloroform, J. A. M. A. **62:** 895-896 (March 21) 1914; Influence of Diet on the Toxicity of Substances Which Produce Lesions of the Liver or the Kidney, ibid. **63:** 136-137 (July 11) 1914.

12. (*a*) Johnson, J.; Ravdin, I. S.; Vars, H. M., and Zintel, H. A.: Effect of Diet on Composition of the Liver in the Presence of Obstruction of the Common Bile Duct, Arch. Surg. **40:** 1104-1115 (June) 1940. (*b*) Ravdin, I. S.; Thorogood, E.; Riegel, C.; Peters, R., and Rhoads, J. E.: The Prevention of Liver Damage and the Facilitation of Repair of the Liver by Diet, J. A. M. A. **121:** 322-324 (Jan. 30) 1943. (*c*) Miller, L. L., and Whipple, G. H.: Liver Injury, Liver Protection and Sulphur Metabolism: Methionine Protects Against Chloroform Liver Injury Even When Given After Anesthesia, J. Exper. Med. **76:** 421-435 (Nov.) 1942. Miller, L. L.; Ross, J. F., and Whipple, G. H.: Methionine and Cystine, Specific Protein Factors Preventing Chloroform Liver Injury in Protein-Depleted Dogs, Am. J. M. Sc. **200:** 739-756 (Dec.) 1940.

13. Jones, C. M.: The Treatment of Acute Hepatic Insufficiency and Its Relation to Prognosis, Am. J. Digest. Dis. **3:** 624-628 (Nov.) 1936.

mented with solutions of dextrose given intravenously. In 1943 Ravdin and associates [12b] reported on the use of high protein intake. More recent studies include the report of Barker, Capps and Allen,[14] who in a careful study of 421 cases of infectious hepatitis in the Mediterranean theater of war were impressed with the value of a high protein, high carbohydrate, low fat diet. They gave as much as 200 Gm. of protein daily, chiefly as beef, milk and cheese. In their opinion it was uncertain whether the chief benefit was from the high protein, high carbohydrate, low fat diet or from the better caloric intake. The same authors [15] reported on 76 cases of chronic infectious hepatitis. One group of their patients received a diet of 250 Gm. of protein, 350 Gm. of carbohydrate and 40 Gm. of fat and were kept at complete rest in bed. The other group was given a similar diet except for a reduction in the protein to 85 Gm., and they were kept at only moderate rest in bed. The first group progressed better. The authors could not determine whether this greater progress was due to the increased amount of protein, calories or rest in bed.

The first report of the use of methionine in toxic hepatitis is that of Beattie, Herbert, Wechtel and Steele.[16] They treated a soldier who had accidentally swallowed 30 to 40 cc. of carbon tetrachloride. A casein digest and methionine were cautiously given intravenously. The clinical symptoms improved and the size of the liver decreased. Recurrence of symptoms and enlargement of the liver on the third day were controlled by similar treatment, and the patient recovered. Reports by Eddy,[17] Peters and associates,[18] and Beattie and Marshall [19] have followed. Some investigators [20] have reported no benefit from the addition of 5 Gm. of methionine to the diet in cases of infectious hepatitis. Hoagland and Shank [21] studied the effects of giving 5 Gm. of methionine daily in 16 cases, 5 Gm. of choline daily in 25 cases and of crude liver extract in 34 cases of infectious hepatitis. None of these procedures produced any changes in the duration of illness, weight curve or those functions of the liver which were studied, which were different from those in a control group.

Patek and Snell and their associates [22] were the first to report lessened mortality and morbidity in cirrhosis after treatment by highly nutritious diets with the addition of vitamins. Reports on the use of choline or methionine in the treatment of cirrhosis have been made by Broun and Muether,[23] Yater,[24] Russakoff and Blumberg,[25] Barker,[26] Wade,[27] Beams [28] and Morrison.[29]

From these data it is impossible adequately to evaluate the benefit of the individual factors, such as intake of calories, protein or carbohydrate, and the effects of vitamin supplements or lipotropic factors, as all were used in various combinations and to varying extents. Other factors, such as ability of the patient to take the prescribed diet, cessation of alcoholic intake and degree of rest enforced, enter the picture. However, all workers have been more or less agreed that adequate caloric intake, especially of proteins and carbohydrates, is a most important factor.

CRITERIA FOR EVALUATION OF RESULTS OF APPLICATION OF NEW METHODS

In the clinical application of these physiologic concepts certain more or less obvious but fundamental facts must be kept in mind. Some of these will be considered in detail.

Nature of the Disease.—Because of its structure, the liver is limited in the way it will respond to injury. Knowledge of etiologic factors in hepatic disease is as yet circumscribed. Various factors may lead to acute hepatitis, such as numerous toxins and the viruses of infectious hepatitis and serum jaundice, but many cases of acute hepatitis occur, in which the etiologic factor is unknown. Nevertheless, the course of acute hepatitis in many cases is self limited, and full recovery occurs. The pathogenesis of cirrhosis is obscure and will remain so until information is obtained concerning its early stages. Though the etiologic role of alcohol is uncertain, the cessation of its use might play a significant part in recovery. However, evaluation of this factor is difficult. Many investigators claim that cirrhosis is the late stage of fatty infiltration of the liver. This may be correct in many cases, but it is not yet proved that cirrhosis always begins in fatty livers. Spontaneous remissions of symptoms occur in cases in which hepatic insufficiency is associated with large, perhaps fatty, livers and also in cases of cirrhosis. These remissions make it more difficult to evaluate any therapeutic procedure correctly. It is generally agreed that the enlarged liver responds better to therapy and carries a more encouraging prognosis than does cirrhosis in the small liver. Treatment of cirrhosis does not affect the fibrosis. Benefit will come only in promoting the efficiency and regeneration of parenchymal cells. The earlier treatment is instituted the better the results should be. Undoubtedly in many cases an irreversible stage is reached, after which treatment is unavailing. In some cases treatment is unavailing even though started early. In general, treatment must consist largely of attempts to arrest the progress of hepatic disease

14. Barker, M. H.; Capps, R. B., and Allen, F. W.: Acute Infectious Hepatitis in the Mediterranean Theater, Including Acute Hepatitis Without Jaundice, J. A. M. A. **128**: 997-1003 (Aug. 4) 1945.

15. Barker, M. H.; Capps, R. B., and Allen, F. W.: Chronic Hepatitis in the Mediterranean Theater: A New Clinical Syndrome, J. A. M. A. **129**: 653-659 (Nov. 3) 1945.

16. Beattie, J.; Herbert, P. H.; Wechtel, C., and Steele, C. W.: Studies on Hepatic Dysfunction: I. Carbon Tetrachloride Poisoning Treated with Casein Digest and Methionine, Brit. M. J. **1**: 209-211 (Feb. 12) 1944.

17. Eddy, J. H., Jr.: Carbon Tetrachloride Poisoning: A Preliminary Report on the Use of Methionine in Hepatitis, J. A. M. A. **128**: 994-996 (Aug. 4) 1945; Methionine in the Treatment of Toxic Hepatitis, Am. J. M. Sc. **210**: 374-380 (Sept.) 1945.

18. Peters, R. A.; Thompson, R. H. S.; King, A. J.; Williams, D. I., and Nicol, C. S.: Sulphur-Containing Amino-Acids and Jaundice, Nature, London **153**: 773 (June 24) 1944.

19. Beattie, J., and Marshall, J.: Methionine in the Treatment of Liver Damage, Nature, London **153**: 525 (April 29) 1944.

20. Higgins, G.; O'Brien, J. R. P.; Peters, R. A.; Stewart, A., and Witts, L. J.: Treatment of Infective Hepatitis with Methionine, Brit. M. J. **1**: 401-402 (March 24) 1945. Wilson, C.; Pollock, M. R., and Harris, A. D.: Therapeutic Trial of Methionine in Infective Hepatitis, ibid. **1**: 399-401 (March 24) 1945.

21. Hoagland, C. L., and Shank, R. E.: Infectious Hepatitis: A Review of Two Hundred Cases, J. A. M. A. **130**: 615-621 (March 9) 1946.

22. Fleming, R. G., and Snell, A. M.: Portal Cirrhosis with Ascites: An Analysis of Two Hundred Cases with Special Reference to Prognosis and Treatment, Am. J. Digest. Dis. **9**: 115-120 (April) 1942. Patek and Post.[3]

23. Broun, G. O., and Muether, R. O.: Treatment of Hepatic Cirrhosis with Choline Chloride and Diet Low in Fat and Cholesterol, J. A. M. A. **118**: 1403 (April 18) 1942.

24. Yater, W. M., in discussion on Greene, C. H.: Physiologic Considerations in the Treatment of Portal Cirrhosis, J. A. M. A. **121**: 715 (March 6) 1943.

25. Russakoff, A. H., and Blumberg, H.: Choline as an Adjuvant to the Dietary Therapy of Cirrhosis of the Liver, Ann. Int. Med. **21**: 848-862 (Nov.) 1944.

26. Barker, W. H.: The Modern Treatment of Cirrhosis of the Liver, M. Clin. North America **29**: 273-293 (March) 1945.

27. Wade, L. J.: Recent Advances in the Therapy of Cirrhosis of the Liver, M. Clin. North America **29**: 479-488 (March) 1945.

28. Beams, A. J.: The Treatment of Cirrhosis of the Liver with Choline and Cystine, J. A. M. A. **130**: 190-193 (Jan. 26) 1946.

29. Morrison, L. M.: The Response of Cirrhosis of the Liver to an Intensive Combined Therapy, Ann. Int. Med. **24**: 465-478 (March) 1946.

by facilitating functional activities, repair and regeneration, and by decreasing the vulnerability of the liver cell.

Possible Influence That New Methods Could Have on Course of Liver Disease.—In acute stages of hepatic diseases, for a priori reasons the so-called liver diet cannot be used in a preventive way unless the dietary standards of the nation are to be changed. From a preventive point of view, however, persons exposed to industrial chemicals which are hepatotoxic, those receiving therapeutic agents which may have similar action and those who have biliary or pancreatic disease should have this diet. Some attempts have been made along this line. Beattie and Marshall [19] recently reported lessened frequency of hepatic injury in arsenical treatment of syphilis after the addition of casein and cystine or methionine to the diet. From a curative point of view, the liver diet could aid regeneration in toxic and infectious hepatitis and in cirrhosis. However, in advanced cirrhosis in which the condition approaches that of the Eck fistula, from a vascular point of view proteins of a certain quality may be detrimental. In less advanced cases, proteins of a certain quality may be conducive to the formation of ascites. These effects have been observed in the experimental animal, but whether they occur in the human being is not known.

Relation of Experimental Disease to Human Disease.—Types of experimental hepatic disease include those produced by various hepatotoxins, those resulting from pancreatectomy and from maintenance of the animals with insulin and those due to diets deficient in certain respects. Infiltration of the liver with fat probably plays a role in all of these. Acute toxic hepatitis of human beings resembles that of animals, but it is seldom that the toxins used for producing cirrhosis in animals play a causative role in the cirrhosis of human subjects. The fatty livers of depancreatized dogs maintained on insulin develop while the animals are on a diet of lean meat, sucrose and no fat. Infiltration of the liver with fat, and occasionally cirrhosis, are seen in certain cases of diabetes and chronic pancreatitis among human beings; but to date my colleagues and I have not been able to demonstrate fatty infiltration of the liver or cirrhosis in cases in which partial or total pancreatectomy has been performed. These factors are at best infrequent causes of cirrhosis in human beings.

Distorted diets, such as those used to produce experimental cirrhosis, would seldom be followed by human beings. Nutritional deficiencies encountered clinically usually are multiple, whereas restriction of a single dietary essential has usually been employed to produce a deficiency syndrome in experimental animals. Experimental cirrhosis also differs from that encountered clinically by the presence of ceroid. There is some circumstantial evidence that deficient diets may play a part in the cirrhosis of human beings. The disease occurs with higher incidence in certain regions where nutrition is poor and nutritional diseases are endemic. The role of alcohol is uncertain and remains debatable. The diet of alcoholic addicts is deficient, particularly in proteins and vitamins, and the disease of the liver may be a manifestation of this deficiency, as are other nutritional defects. However, only about 5 per cent of persons with alcoholism show hepatic damage, and in many cases of cirrhosis seen at necropsy no history of alcoholism is obtained. Some further evidence that dietary deficiency may cause hepatic disease in human beings is the incidence of liver disorders among the nutritional disturbances encountered in the repatriated prisoners of war, whose limited diet was largely carbohydrate. On the other hand, hepatic disease is encountered infrequently in the undernutrition of anorexia nervosa, of long-continued organic gastrointestinal disease or from prolonged use of eccentric diets. Moreover, most patients who have cirrhosis of the liver are well nourished at the onset of the disorder. Furthermore, the fact that the fatty liver with varying degrees of hepatic insufficiency or cirrhosis in human beings may show improvement or remission of symptoms on modern dietary management is no indication that a dietary deficiency is etiologically significant. The chemical changes as well as some deficiencies encountered in cirrhosis could as likely be secondary manifestations depending on the inability of the liver to perform its normal metabolic processes. At present the question whether impaired nutrition is a factor in the production of cirrhosis in man must be left in abeyance for continued investigation.

Lipotropic Substance in the Therapeutic Program.—Choline is found in large amounts in liver, white wheat flour, polished rice, skimmed milk, dried yeast, soybean meal, peanut meal, cheddar cheese, butter and eggs. The methionine content of the proteins of milk, eggs, meat, fish and whole corn varies from 3 to 4 per cent by weight. The daily requirement of methionine is about 3 Gm. A diet of 120 Gm. of protein, 500 Gm. of carbohydrate and 60 Gm. of fat contains about 3.5 Gm. of methionine. Diets now advocated for disease of the liver have a content of 100 to 200 Gm. of protein, 300 to 500 Gm. of carbohydrate and 50 to 175 Gm. of fat. Such diets obviously contain adequate amounts of choline and methionine. From this there would appear to be little rationale in giving these as supplements, except to patients who are unable to maintain an adequate dietary intake. The published results of the use of these supplements have not contained convincing evidence of their effectiveness. Many studies have given negative results, and most of the others have been inconclusive.

Necessary Criteria.—Criteria for judging the benefit derived from the various dietary procedures have varied. Some studies have been based on the clinical improvement, and the validity of the results depended on the judgment of the investigator. Duration of hospitalization, mortality rate, severity of disease and depth of jaundice, the time required for jaundice to subside so that an arbitrary level of serum bilirubin near normal was obtained, weight curve, duration of anorexia, changes in size and tenderness of the liver, duration of biliuria and frequency of relapses were factors on which judgment of benefit was based. In some studies no controls were established. In others, groups of patients who received a therapeutic agent which was not given to the control group were studied. Some of the patients who served as controls, however, presented other variables. In general, in cases of toxic or infectious hepatitis in which adequate controls were established negative results were obtained when choline or methionine were added to the program of treatment. In cirrhosis it is extremely difficult to establish adequate controls. The chronicity of the disease, variability of the size of the liver and spleen, presence or absence of jaundice and its intensity, presence or absence of ascites and spontaneous remission of symptoms have much influence on

the results of any treatment. Changes in the various biochemical disturbances induced by therapeutic agents have been utilized in the evaluation of results but are not too satisfactory. Blood sugar usually is normal and hypoglycemia is a rare occurrence in cirrhosis, whether the glycogen content of the liver is normal or abnormal. The amount of fat in the blood may be normal, increased or decreased, but little is known of variations in the content of fat in the liver. It is not known whether an increased quantity of fat in the liver is due to increased mobilization from the depots of fat to the liver or decreased ability of the liver to work fat over and move it out, or to both factors. Lipotropic agents have little effect on an abnormal level of fat in the blood in cases of cirrhosis. Chemical studies of the fat content of the liver before and after the use of lipotropic agents have not been made, nor has a study of the rate of turnover of lipoids with radioactive phosphorus or other methods. The concentration of proteins in the blood is often decreased, particularly in the more advanced stages of the disease, and responds poorly to the increased administration of protein or to other therapeutic agents. When manifestations of vitamin deficiencies occur, administration of extra amounts of these factors often fails to give improvement. These evidences of resistance to therapy may indicate approach to the stage of irreversibility, but absence of measurable improvement does not necessarily mean that high caloric intake, particularly of carbohydrate and protein, may not be beneficial.

SUMMARY AND CONCLUSIONS

Modern treatment of hepatic disease has developed from the application of advances in knowledge of the physiology of the liver and from the results of experimental production of hepatic disease. While the known functions of the liver are many and are interrelated, the seriousness of hepatic disease depends largely on impairment of the metabolic activities. Evolution of the present treatment of hepatic disease has been largely along nutritional lines and has included the step by step addition of high intake of carbohydrate, then proteins and vitamins and, finally, lipotropic agents.

In the clinical application of the newer data of physiology, it is important that adequate controls be established. This is advisable not because the experimental data may be inaccurate but because they are in the borderline zone of advancing knowledge and cannot necessarily be viewed in their proper perspective at the present time. It is essential that the varying nature of the disease, together with such factors as cessation of alcoholic intake, degree of rest and ability of the patient to take the prescribed nutritive elements, as well as the possible influence of the dietary factors themselves, be constantly considered from a preventive and curative point of view. Evidence indicates that the high caloric intake, particularly of carbohydrate and protein, has been a distinct advance. The question of intake of fat remains unsettled. Administration of certain of the vitamins is probably advantageous. Lipotropic agents were hailed on theoretic grounds to be potentially important adjuncts, but experience to date has not substantiated this supposition or at best has only been suggestive of it. Absence of measurable results, however, does not necessarily mean that some benefit may not be obtained.

INTERPRETATION OF LIVER FUNCTION TESTS

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Since a comprehensive discussion of liver function tests would require much more time than is available in this symposium, this article is limited to a presentation of the indications for doing the tests, of specific recommendations of the most satisfactory technics of certain principles and limitations in their interpretation and of references to the most recent authoritative literature. Those interested in a more detailed discussion may consult several excellent recent reviews.[1]

From the point of view of an internist teaching both physical and laboratory diagnosis, I want to emphasize that liver function tests, in fact all laboratory tests, are a valuable supplement to but no substitute for a well taken history and a thorough physical examination. The intelligent interpretation of the tests depends on an understanding of the underlying physiologic principles as outlined in the preceding discussion,[2] of the common sources of error in the methods [3] and of the

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1. (*a*) Lichtman, S. S.: Diseases of the Liver, Gallbladder and Bile Ducts, Philadelphia, Lea & Febiger, 1942, pp. 15-906. (*b*) Tumen, H. J., in Bockus, H. L.: Gastro-Enterology, Philadelphia, W. B. Saunders Company, 1946, vol. 3, pp. 1-716. Ivy, A. C., and Roth, J. A.: Why Do a Liver Function Test? Gastroenterology **1:** 655 (July) 1943. Hoagland, E. L., and Shank, R. E.: Infectious Hepatitis, J. A. M. A. **130:** 615 (March 9) 1946. Cantarow, A., and Trumper, M.: Clinical Biochemistry, ed. 3, Philadelphia, W. B. Saunders Company, 1946, pp. 408-472. Watson, C. J.: The Bile Pigments, New England J. Med. **227:** 665 (Oct. 29); 705 (Nov. 5) 1942.

2. Weir, J. F.: Application of Modern Physiologic Concepts to Treatment of Disease of the Liver, this issue, p. 579.

3. (*a*) Osgood, E. E.: Laboratory Diagnosis, ed. 3, Philadelphia, The Blakiston Co., 1940, pp. 133-160, 356-378 and 410-413. (*b*) Malloy, H. T., and Evelyn, K. A.: The Determination of Bilirubin with a Photoelectric Colorimeter, J. Biol. Chem. **119:** 481 (July) 1937. Watson, C. J.: Some Newer Concepts of the Derivatives of Hemoglobin, Blood **1:** 99 (March) 1946. Watson, C. J., and Ducci, H.: The Quantitative Determination of the Serum Bilirubin with Special Reference to the Prompt-Reacting and the Chloroform-Soluble Types, J. Lab. & Clin. Med. **30:** 293 (April) 1945. (*c*) Watson, C. J.; Schwartz, S.; Sborov, U., and Bertie, E.: Studies of Urobilinogen: V. A Simple Method for the Quantitative Recording of the Ehrlich Reaction as Carried Out with Urine and Feces, Am. J. Clin. Path. **14:** 605 (Dec.) 1944. (*d*) Schwartz, S.; Sborov, U., and Watson, C. J.: Studies of Urobilinogen: IV. The Quantitative Determination of Urobilinogen by Means of the Evelyn Photoelectric Colorimeter, ibid. **14:** 598 (Dec.) 1944. (*e*) Bockus, H. L.: Gastroenterology, Philadelphia, W. B. Saunders Company, 1946, vol. 3, pp. 467-515. (*f*) Gellis, S. S., and Stokes, J.: The Methylene Blue Test in Infectious Hepatitis, J. A. M. A. **128:** 782 (July 14) 1945. (*g*) Foord, A. G., and Baisinger, C. F.: Comparison of Tests for Bilirubin in Urine, Am. J. Clin. Path. **10:** 238 (March) 1940. Hawkinson, U.; Watson, C. J., and Turner, R. H.: A Modification of Harrison's Test for Bilirubin in the Urine, J. A. M. A. **129:** 514 (Oct. 13) 1945. (*h*) Osgood, E. E., and Wilhelm, M. M.: Reticulocytes, J. Lab. & Clin. Med. **19:** 1129 (July) 1934. Osgood,[3a] p. 406. (*i*) Osgood, E. E., and Ashworth, C.: Atlas of Hematology, San Francisco, J. W. Stacey, Inc., 1937, pp. 458-506. Osgood,[3a] pp. 161-279. (*j*) Shank, R. E., and Hoagland, C. L.: A Modified Method for the Quantitative Determination of the Thymol Turbidity Reaction of Serum, J. Biol. Chem. **162:** 133 (Jan.) 1946. MacLagan, N. F.: The Thymol Turbidity Test as an Indicator of Liver Dysfunction, Brit. J. Exper. Path. **15:** 234 (Dec.) 1944. (*k*) Watson, C. J.; Rappaport, E. M.; Hawkinson, V., and Gieberhain, M.: A Comparison of the Results Obtained with the Hanger Cephalin-Cholesterol Flocculation Test and the MacLagan Thymol Turbidity Tests in Patients with Liver Disease, J. Lab. & Clin. Med. **30:** 983 (Dec.) 1945. Hanger, F. M.: The Flocculation of Cephalin-Cholesterol Emulsions by Pathological Sera, Tr. A. Am. Physicians **53:** 148, 1938; Serological Differentiation of Obstructive from Hepatogenous Jaundice by Flocculation of Cephalin-Cholesterol Emulsions, J. Clin. Investigation **18:** 261 (May) 1939. (*l*) Mateer, J. G.; Baltz, J.; Marian, D. F.; Hollands, R. H., and Yagle, E. M.: A Comparative Evaluation of the Newer Liver Function Tests, Am. J. Digest. Dis. **9:** 13 (Jan.) 1942. (*m*) Quick, A. J.: An Appraisal of the Hippuric Acid Test After Twelve Years of Clinical Trial, Marquette M. Rev. **10:** 63 (March) 1945. (*n*) Hoffbauer, F. W.; Evans, G. T., and Watson, C. J.: Cirrhosis of Liver, with Particular Reference to Correlation of Composite Liver Function Studies with Liver Biopsy, M. Clin. North America **29:** 363 (March) 1945. Sherlock, S.: Hippuric-Acid Synthesis Test of Liver Function, Lancet **1:** 159 (Feb. 2) 1946. (*o*) Bassett, A. M.; Althausen, T. L., and Coltrin, G. C.: A New Galactose Test for Differentiation of Obstructive from Parenchymatous Jaundice, Am. J. Digest. Dis. **8:** 432 (Nov.) 1941. (*p*) Aggeler, P. M.; Howard, J.; Lucia, S. P.; Clark, W., and Astoff, A.:

(Footnote 3 continued on next page)

skill and reliability of the persons collecting the samples and doing the tests.

Table 1 lists the symptoms and signs which indicate the desirability of liver function tests. Table 2 gives the liver function tests arranged in four groups. When any of the symptoms or signs listed in table 1 are present the tests listed in group *A* of table 2 should be performed. If any of the tests in group *A* give abnormal results or if the symptoms and signs suggest hepatocellular damage, the tests in group *B* of table 2 should be performed. If these indicate severe hepatocellular damage the tests in group *C* are worth while, not so much for diagnosis as for evaluation of the severity of the damage, since this group of tests gives abnormal results only in the severest diffuse impairment of function. If tests in group *A* or *B* are positive and a diagnosis has still not been reached, the more difficult and time-consuming tests listed in group *D* may add useful information provided facilities are available for performing them. However, these tests give abnormal results in many diseases in which the liver and biliary tract are not involved.

TABLE 1.—*Indications for Liver Function Tests*

Jaundice	Anorexia
Enlarged liver	Pruritus
Tender liver	Nausea or vomiting
Small liver	Fatty stools
Nodular liver	Flatulence
Spider nevi	Splenomegaly
Light or dark stools	Dietary deficiency
Deep amber urine	Alcoholism
Fetor hepaticus	Hyperthyroidism

The second column in table 2 gives the specific information sought for in performing the test. The third column lists only simple tests which should be available to every physician. These occasionally give misleading results, so when the results fail to check with the rest of the evidence or when the facilities of well equipped laboratories are available, the tests listed in the last column should be performed as checks or as the preferred technic. When two or more tests for the same purpose are listed in the same column the first is the simpler and more useful for screening purposes, and the last is the more reliable. The footnote numbers refer to the most useful articles on the technic but not necessarily to the original description, which will be found in the references cited.

Table 3 outlines the only classification of jaundice which, in my opinion, it is possible to make by laboratory methods. It includes the normal values and typical results of only the simplest recommended methods. Clinical and laboratory experience and careful study of the literature have failed to reveal any test which will differentiate reliably the jaundice of intrahepatic disease from the jaundice of extrahepatic obstruction. Each type of jaundice may occur without hepatocellular damage, and hepatocellular damage may occur in the absence

TABLE 2.—*Tests Recommended for Evaluation of Diseases of the Liver and Biliary Tract*

Group	Test For	Simplest	Most Reliable
A	Serum bilirubin, amount	Icterus index [3a]	Malloy and Evelyn [3b]
	Serum bilirubin, type	Qualitative van den Bergh [3a]	1′, 15′ and 30′ [3b]
	Urine urobilinogen	Wallace and Diamond [3a] Watson and associates [3c] Inspection	Schwartz, Sborov and Watson [3d]
	Fecal urobilinogen	Watson and associates [3c]	Schwartz, Sborov and Watson [3d]
	Fecal bilirubin	.....	Duodenal drainage [3e]
	Urine bilirubin	Stained linen Methylene blue [3f] Rosenbach [3a]	Modified Harrison [3g]
	Hematogenous jaundice	Reticulocyte count [3h]	Complete hematologic study [3i]
B	Abnormal proteins	Thymol turbidity [3j]	Cephalin flocculation [3k]
	Excretory function (in nonjaundiced)	Sulfobromophthalein [3a]	Serial sulfobromophthalein [3l]
	Aminoacetic acid formation	Hippuric acid (oral) [3m]	Hippuric acid intravenously [3n]
C	Glycogen formation	Oral galactose tolerance [3a]	Intravenous galactose tolerance [3o]
	Prothrombin formation	.....	Prothrombin time 24 hr. after 2 mg. menadione intramuscularly [3p]
	Extreme diffuse impairment	Fasting hypoglycemia [3a] Tyrosinuria (Osgood,[3a] p. 355. Weir.[2] Lichtmen,[1a] pp. 312-314)	
D	Alkaline phosphatase	.....	King and Armstrong [3q] Binkley, Shank and Hoagland [3r]
	Total cholesterol; cholesterol esters	.....	Schoenheimer and Sperry [3s]
	Plasma proteins	....	Kingsley, G. R.: J. Lab. & Clin. Med. **27**: 840, 1942

TABLE 3.—*Classification of Jaundice*

			Regurgitant or Obstructive		Retention or Hematogenous
	Normal	Latent	Partial	Complete	
Serum bilirubin					
Icterus index	4 to 6	7 to 15	16 to 100	40 to 300	7 to 100
Qualitative van den Bergh	0-indirect	Indirect or biphasic	Direct or biphasic	Direct	Indirect or biphasic
Bilirubinuria	0	0 to 1+	1+ to 4+	2+ to 4+	0
Urobilinogen					
Urine	0 to 1:10	1:20 to 1:80	1:20 to 1:320	0 to 1:10	1:20 to 1:100
Feces	Normal	Normal ±	Decreased	Absent	Increased
Reticulocytes	0.5 to 4.0%	0.5 to 10%	0.5 to 4.0%	0.5 to 4.0%	2.0 to 90%

Standardization of the Quick Prothrombin Test, Blood **1**: 220 (May) 1946. Quick, A. J.: The Hemorrhagic Diseases, Springfield, Ill., Charles C Thomas, Publisher, 1942. Sweet, N. J.; Lucia, S. P., and Aggeler, P. M.: Clinico-Pathologic Correlation Between Hepatic Damage and the Plasma Prothrombin Concentration, Am. J. M. Sc. **203**: 665 (May) 1942. (*q*) King, E. J., and Armstrong, A. R.: A Convenient Method for Determining Serum and Bile Phosphatase Activity, Canad. M. A. J. **31**: 376 (Oct.) 1934. (*r*) Binkley, F.; Shank, R. E., and Hoagland, C. L.: Modification of the King-Armstrong Method for the Determination of Phosphate, J. Biol. Chem. **156**: 253 (Nov.) 1944. (*s*) Schoenheimer, R., and Sperry, W. M.: A Micromethod for the Determination of Free and Combined Cholesterol, ibid. **106**: 745 (Sept.) 1934.

of jaundice or in association with the laboratory results typical of any one of the types of jaundice listed. Therefore, notwithstanding the widespread use of the term, it seems wise to accept the facts, discard the term hepatocellular jaundice and speak of patchy or diffuse hepatocellular damage without jaundice or with latent, partial obstructive, complete obstructive or hematogenous jaundice, as the case may be at that particular time in that particular patient.

Table 4 shows typical results of the simpler tests useful in evaluating the functional status of the characteristic cell of the hepatic parenchyma in health and in patchy and diffuse disease of the liver. It clearly reveals the limitations of these tests which are due to the tremendous reserve and the great regenerative capacity of the liver. Until this reserve and any functional regenerated cells are reduced to about 20 per cent of those in the normal liver, patchy lesions may show no evidence of impairment to liver function tests, and even the most extensive destruction by patchy lesions seldom shows more impairment to function tests than does mild diffuse damage. The tests are arranged roughly in the order of decreasing sensitivity. Since the

TABLE 4.—*Classification of Hepatocellular Damage*

Tests	Normal	Patchy		Diffuse	
		<80%	>80%	Mild	Severe
Sulfobromophthalein, 5 mg./Kg. dose 30'.....	<5%			Trace—15%	>15% retention
Thymol turbidity.....	0 to 4 units			5 to 10 units	11 to 35 units
Hippuric acid after 6 Gm. sodium benzoate	4.2 to 5.9 Gm./4 hr.			3 to 5 Gm./4 hr.	0 to 3 Gm./4 hr.
Galactose tolerance after 40 Gm. orally	Under 3 Gm./5 hr.			2 to 5 Gm./5 hr.	Over 5 Gm./5 hr.
Prothrombin time 24 hr. after menadione 2 mg. intramuscularly.....	Normal			Improves	No improvement
Hypoglycemia.....	Absent			Slight or absent	Pronounced
Tyrosinuria.....	0			0	+ to ++++

tests in the lower half of table 4 are positive only in severe, diffuse hepatocellular damage, such as typically occurs in association with the pathologic picture of acute or subacute hepatic necrosis, they are of value not for diagnosis but for prognosis, guiding therapy and evaluating the severity of damage, in cases in which the tests in the upper half of the table are strongly positive. Failure to appreciate this has led many physicians to discard them as of no value.

The sulfobromophthalein sodium test is of most value in the nonjaundiced patient, as it is seldom negative in a person who has clinical icterus. A high concentration of urobilinogen in the urine in the absence of complete obstructive or hematogenous jaundice also suggests hepatocellular damage. Although the thymol turbidity and cephalin flocculation tests are tests for an abnormal lipoglobulin and failure of protection of normal gamma globulin by an adequate amount of normal albumin, respectively, these flocculation tests are probably the most sensitive and generally useful tests in calling attention to the probability of intrahepatic disease. The hippuric acid test is probably the most useful in the evaluation of the severity of moderate degrees of impaired hepatic function when impaired renal function, which commonly is associated with severe impairment of the liver's function, is excluded by a simultaneous phenolsulfonphthalein test.[3n] The galactose tolerance test is the most useful test for evaluating the course of severe, diffuse damage to hepatic cells.

The more frequently encountered groups of causes of the different types of jaundice are listed in table 5,

TABLE 5.—*Common Causes of Jaundice*

Latent	Obstructive		
	Partial	Comp'ete	Hematogenous
Early, mild and recovery phases of all causes	Stone	Carcinoma of ampulla or head of pancreas	Internal blood destruction
	Early, and moderate diffuse, hepatocellular damage	Fibrosis	High gastrointestinal or internal hemorrhage
	All patchy lesions	Stone (intermittent)	Hemolytic icterus
	Cirrhoses except biliary	Severe, diffuse hepatocellular damage	Erythroblastosis fetalis
	Passive congestion	Lymphadenopathy at hilus	Malaria
	Early with all causes of complete	Biliary cirrhosis	Pernicious anemia
	Severe, late, hematogenous	Terminal cirrhoses	Hemorrhagic infarcts
		Patchy lesions at hilus	Sickle cell anemia
			Hemolytic transfusion reaction
			Hemolytic infection
			Hemolytic poisons or allergens

and those of the different types of hepatocellular damage in table 6 with the commoner causes at the top and the less common causes at the bottom of the columns. Not only is there considerable overlapping of causes, but many patients may exhibit two of them at the same time. Furthermore, these lists are incomplete; there are many subdivisions to many of the groups, and there is evidence to suggest that there are diseases of the liver which are as yet unnamed and undescribed. More complete lists will be found in the reviews cited.[1] The diagnoses of some of these diseases are discussed in more detail in subsequent papers in this symposium.

Far more valuable in diagnosis than the clinical observations on any one date is the time-intensity curve of

TABLE 6.—*Causes of Hepatocellular Damage*

Patchy Lesions	Diffuse Lesions
Carcinoma	Epidemic hepatitis
Primary	Homologous serum jaundice
Secondary	Poisons causing hepatic damage
Cirrhoses	Carbon tetrachloride
Laennec's	Chloroform
Biliary (6 types)	Phosphorus
Congestive	Phenylhydrazine
Postnecrotic	Organic arsenicals
Pigmentary	Cinchophen and neocinchophen
Syphilitic	Sulfonamide compounds
Fatty	Spirochetal jaundice
Wilson's hepatolenticular degeneration	Hyperthyroidism
	Eclampsia
Abscesses	Ascending hepatitis secondary to cholangitis
Amebic	Severe or prolonged hematogenous jaundice
Pylephlebitic	Passive congestion
Cholangitic	Anoxia
Pyemic	Virus pneumonia
Boeck's sarcoid	Infectious mononucleosis
Hodgkin's disease	Yellow fever
Lymphosarcoma	
Leukemias	
Polycystic liver	
Amyloidosis	
Echinococcus cysts	

the characteristic course of the jaundice and damage to the liver, as illustrated in charts 1 to 8. Note that in each of these figures the position of the curve indicates the type of jaundice to be expected in a typical case at any stage in the course of the disease. The cross hatching indicates the presence of hepatocellular damage detectable by the liver function tests now available. The severity of the impairment of liver function

is roughly indicated by the spacing of the cross hatches, far apart if mild and close together if severe. The time scale is in percentage of the total duration of the disease. The typical age of onset is indicated below each figure at the left and the approximate typical duration at the right. Obviously there are wide individual variations from case to case, so each curve should be visualized as having a broad band on either side of it and the cross hatching as showing considerable variation in the spacing and point of starting and ending.

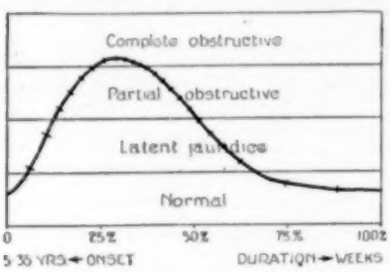

Chart 1.—Infectious hepatitis.

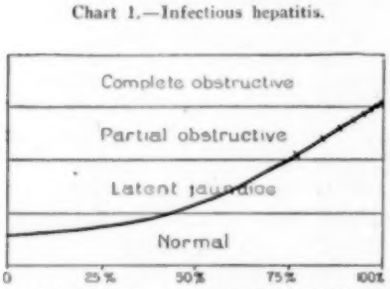

Chart 2.—Metastatic carcinoma.

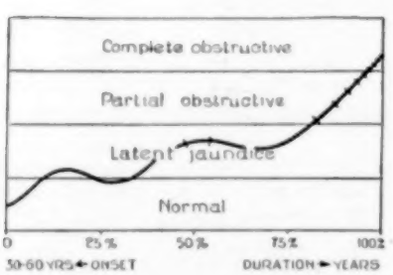

Chart 3.—Laennec's cirrhosis.

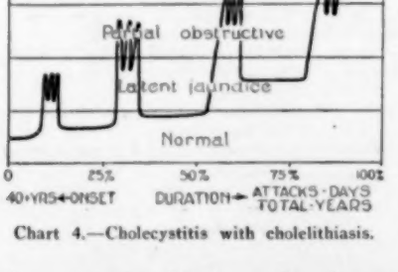

Chart 4.—Cholecystitis with cholelithiasis.

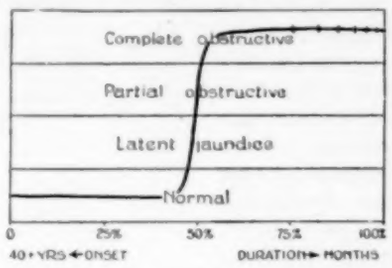

Chart 5.—Carcinoma obstructing common bile duct.

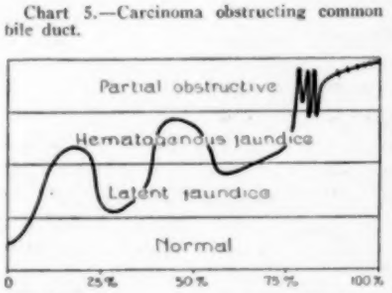

Chart 6.—Hemolytic icterus.

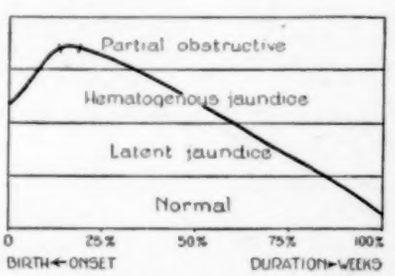

Chart 7.—Erythroblastosis fetalis.

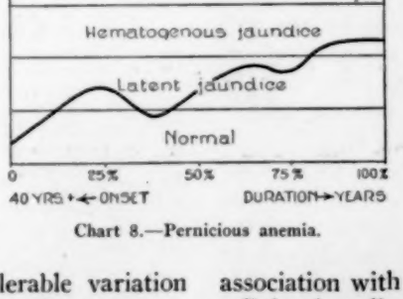

Chart 8.—Pernicious anemia.

Charts 1 to 5 are typical of predominantly obstructive jaundice and charts 6 to 8 of predominantly hematogenous jaundice.

Chart 1 is typical of the diffuse hepatic damage group, and only minor variations from this picture would be found in homologous serum jaundice or hepatic damage due to poisoning or to idiosyncrasy to a drug.

Charts 2 and 3 illustrate characteristic observations in patchy lesions of the liver and charts 4 and 5 of predominantly partial obstructive and predominantly complete obstructive jaundice, respectively. Although identical laboratory observations could be found on some one day in the course of any of the diseases of which these five are prototypes, the character of the curve over a period of time would serve to distinguish them.

Charts 6, 7 and 8 illustrate different forms of hematogenous jaundice. Since latent jaundice is merely subclinical jaundice, in this group of conditions the laboratory tests in the subclinical stage approach those of hematogenous jaundice, whereas in the conditions illustrated by charts 1 to 5 they approach the picture of partial obstructive jaundice.

Occasionally the observations in partial obstructive jaundice, hepatic damage and hematogenous jaundice are of almost equal intensity, as (1) when a patient has two diseases or (2) when extensive internal hemorrhage has occurred from prothrombin deficiency in a patient with a cause for liver damage and obstructive jaundice or (3) when severe hepatic anoxia from anemia and pigment-thickened bile add the obstructive picture to an initially predominantly hematogenous jaundice. Such combinations are the rule in spirochetal disease and yellow fever, are common in severe cases of erythroblastosis fetalis and during the acute crises of hemolytic anemias, and may result from overdosage of drugs, such as phenylhydrazine, that are both hemolytic and hepatoxic.

SUMMARY

Liver function tests alone can never be expected to establish a diagnosis.

They will indicate the presence of disease affecting every liver cell and of patchy disease when more than 80 per cent of the parenchyma is involved.

They will detect subclinical jaundice and classify clinical jaundice as partial or complete obstructive, or hematogenous.

Since hepatocellular damage may occur in the absence of jaundice or in association with any type of jaundice, the term hepatocellular jaundice should be discarded.

An ideal diagnosis as a basis for treatment should indicate specifically the exact anatomic site of each lesion; the nature, stage and extent of the pathologic process; the agent responsible for this specific pathologic process, and the nature and degree of the functional disturbance resulting from the pathologic process. Such a diagnosis can be made only by correlating all the data from the history, physical examination, the tests herein considered and specific tests for the determination of the underlying cause.

DIAGNOSTIC MANAGEMENT OF PATIENTS WITH JAUNDICE

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and
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In spite of recent advances in our knowledge of hepatobiliary disease, a significant proportion of patients with jaundice still present a baffling problem in differential diagnosis. The importance of this problem is accentuated by the necessity of a decision in a large majority of such cases as to whether surgical intervention is indicated. For this reason we have analyzed 100 recent cases of jaundice which presented problems in differential diagnosis and in which the diagnosis was definitely established by operative intervention, autopsy or clinical course (table 1).

Data from the history, physical examination and laboratory study of these patients which proved of practical diagnostic value will be contrasted with data which are usually considered pertinent but which contributed little to the solution of the problem in our patients. Finally, since a certain number of cases defy all attempts at clinical differentiation, we shall outline a program for the effective handling of patients with jaundice in whom no definite diagnosis as to the type of jaundice can be made, with the object both of avoiding the danger of exploratory operation in the greatest possible number of patients with hepatitis and of guarding the patients from the harmful effects of prolonged extrahepatic obstruction.

The conventional classification of jaundice into hemolytic, obstructive and parenchymatous types according to the original cause of jaundice is followed in this paper. We are cognizant of the fact that mixed types of jaundice, especially obstructive plus parenchymatous are present in most cases after either type of jaundice has existed for several weeks.

In the following analysis the main stress is laid on the differentiation between obstructive and parenchymatous jaundice because patients with hemolytic jaundice seldom present a difficult problem. This is true for two reasons. First, patients with chronic hemolytic icterus as a rule are not very ill and have only mild jaundice, so that surgical intervention in the right upper quadrant of the abdomen is seldom considered. Second, the presence of several characteristic clinical features usually enables the clinician to distinguish hemolytic from other types of jaundice. These features are a familial history, repeated painless attacks of jaundice with an icterus index under 50 units, normal stools, absence of bilirubin in the urine and reticulocytosis.

RESULTS

I A. *Data of Value in the History.*—Sex: In our series data of value in the history (table 2) revealed that obstructive jaundice was twice as common in men as in women. This was due to the fact that men with carcinoma of the pancreas obstructing the common biliary duct comprised 91 per cent of all such cases. The sex of our patients was of some assistance also in the diagnosis of hepatic cirrhosis, since 66 per cent of cases of this disease were encountered in men and 34 per cent in women, giving a ratio of 2 to 1. Studies in the literature [1] reveal an almost 4 to 1 preponderance of obstructive jaundice in men.

Past History of Cholecystic Disease: There was a past history of cholecystic disease in 85 per cent of our patients with choledocholithiasis and in 30 per cent of patients with jaundice due to other causes. Our data in this respect are in general agreement with those found in the literature.

Biliary Colic: Seventy-five per cent of our patients with typical biliary colic had obstructive jaundice and 25 per cent had parenchymatous jaundice. However, only 40 per cent of our patients with stone in the common bile duct had biliary colic. Lichtman [2] and Kiefer [3] described colicky pain in the right hypochondrium in a considerable number of patients with obstruction due to carcinoma of the pancreas or biliary ducts, while Weiss [4] stated that hepatitis may be ushered in by severe epigastric pain radiating to the right shoulder. Biliary colic, then, may be present in all types of jaundice but is seen most frequently in choledocholithiasis. A positive history is of more diagnostic significance than a negative one.

TABLE 1.—*Distribution of Cases According to Types of Jaundice*

Obstructive jaundice		
Common duct stone	20	
Carcinoma of the pancreas	23	
Lymphosarcoma	1	
Stricture of the common duct	2	
	46	
Parenchymatous jaundice		
Portal cirrhosis	24	
Biliary cirrhosis	2	
Xanthomatous biliary cirrhosis	1	
Acute hepatitis	22	
Acute yellow atrophy of the liver	2	
Primary carcinoma of the liver	1	
	52	
Hemolytic jaundice		
Congenital hemolytic icterus	2	
Total		100

TABLE 2.—*Data of Value in the History for the Differential Diagnosis of Jaundice*

	Obstructive Jaundice, %	Carcinoma, %	Common Duct Stone, %	Parenchymatous Jaundice, %	Cirrhosis, %
Sex					
Male	(66)*	(91)	..	..	(66)
Female	(34)	(9)	..	..	(34)
Cholecystitis	..	..	(85)†	..	..
Biliary colic	75	..	(40)	25	..
Chills and fever	70	..	50	30	..
Alcoholism	12	..	..	88	(64)
Weight loss over 10 Kg.	88	66 (55)	..	12	..

* Figures in parentheses indicate the percentage of patients with a given diagnosis in whom this observation was made.
† Thirty per cent of all other patients had a past history of cholecystic disease.

From the Department of Medicine, University of California Medical School.

Read in a symposium on "Diseases of the Liver" before the joint meeting of the Section on Gastro-Enterology and Proctology and the Section on Pathology and Physiology at the Ninety-Fifth Annual Session of the American Medical Association, San Francisco, July 5, 1946.

1. (*a*) Green, C. H.: Physiologic Considerations in the Treatment of Portal Cirrhosis, J. A. M. A. **121**: 715 (March 6) 1943. (*b*) Patek, A. J., and Post, J.: Treatment of Cirrhosis of the Liver by a Nutritious Diet and Supplements Rich in Vitamin B Complex, J. Clin. Investigation **20**: 481 (Sept.) 1941. (*c*) Ratnoff, O. D., and Patek, A. J.: The Medical History of Laennec's Cirrhosis of the Liver: An Analysis of Three Hundred and Six Cases, Medicine **21**: 207 (Sept.) 1942.
2. Lichtman, S.: Diseases of the Liver, Gall-Bladder and Bile Ducts, Philadelphia, Lea & Febiger, 1942.
3. Kiefer, E. D.: Carcinoma of the Pancreas, Arch. Int. Med. **40**: 1 (July) 1927.
4. Weiss, S.: Diseases of the Liver, Gall-Bladder, Ducts and Pancreas: Their Diagnosis and Treatment, New York, Paul B. Hoeber, Inc., 1935.

Chills and Fever: Chills and fever are common symptoms accompanying jaundice and are usually considered of little diagnostic value, since they may usher in an attack of hepatitis or may be associated with cholangitis in obstructive jaundice.[2] However, we found them of some significance, since 70 per cent of our patients with chills and fever had obstructive jaundice and 50 per cent had a stone in the common bile duct.

Alcoholism: Eighty-eight per cent of patients who admitted moderately severe to severe alcoholism had parenchymatous jaundice. Such an alcoholic history was present in 64 per cent of our patients suffering from hepatic cirrhosis with jaundice. Recent studies of cirrhosis of the liver without reference to jaundice revealed an incidence of alcoholism of between 38 per cent [1a] and 87 per cent.[1b]

Loss of Weight: Most types of jaundice are frequently accompanied by loss of weight. In cirrhosis of the liver [1b] and in choledocholithiasis [5] the loss of weight is usually slow and associated with digestive disturbances, whereas in carcinoma of the pancreas it often is not only well defined but also rapidly progressive.[6] Among patients in this series who lost 10 Kg. or more in weight, 88 per cent had obstructive jaundice, and in 66 per cent this loss of weight was due to carcinoma of the pancreas. In 11 per cent of cases the severe loss of weight was associated with hepatitis. Twelve patients reported not only a pronounced but also a rapidly progressive loss in weight, and all of them were found to have carcinoma of the pancreas. A positive history is again more significant than a negative one, since only 55 per cent of our patients with pancreatic carcinoma had a weight loss exceeding 10 Kg.

TABLE 3.—*Physical Observations of Value in the Differential Diagnosis of Jaundice*

	Obstructive Jaundice, %	Carcinoma, %	Common Duct Stone, %	Parenchymatous Jaundice, %	Hepatitis, %	Cirrhosis, %
Marked hepatomegaly	27	..	..	73	..	..
Ascites	9	..	..	91	15	76 (69)*
Collateral circulation	9	..	..	91	9	82 (38)
Angiomas	0	..	..	100	12	88 (29)
Palpable gallbladder	100	80 (35)	11	0	..	..
Splenomegaly	26	..	..	74	..	..

* Figures in parentheses indicate the percentage of patients with a given diagnosis in whom this observation was made.

I B. *Data of Little Value in the History.*—Age: The incidence of age usually plays a prominent part in statistical studies of hepatic disease. For example, in Flood's series,[5] 80 per cent of patients with obstructive jaundice were over 40 years of age and 80 per cent of patients with parenchymatous jaundice were under 40 years of age. The average age of our patients with obstructive jaundice was 57 years and that of our patients with parenchymatous jaundice, 46 years, thus allowing no useful diagnostic conclusions in individual cases. Our 2 patients with acute yellow atrophy of the liver were 62 and 79 years of age.

Prodromal Symptoms: Anorexia, nausea, epigastric distress, malaise and symptoms referable to the upper part of the respiratory tract are frequently described as the preicteric stage of acute hepatitis.[7] In our series such prodromal symptoms were of minor importance in differential diagnosis, since they were present not only in patients with acute hepatitis but also in 2 of 5 patients with obstructive jaundice.

Pain in the Abdomen and Back: Exclusive of biliary colic, pain in the abdomen and back occurred in nearly one third of our patients, of whom 58 per cent had obstructive jaundice and 42 per cent had parenchymatous jaundice. The type or exact location of pain experienced by these patients was of no greater value in differential diagnosis than the incidence of pain. This was not unexpected, since both inflammatory and obstructive lesions of the hepatobiliary system are capable of causing distention of Glisson's capsule or of the biliary apparatus and in this manner causing pain.

Relationship of Onset of Jaundice to Onset of Pain: Weiss [4] stated that jaundice appears within a matter of hours after the impaction of a gallstone in the common duct, whereas it takes several days for jaundice to be established after the onset of hepatitis. Berk [6] found that in 15 of 18 patients with carcinoma of the pancreas, in whom the order of appearance of these two symptoms could be established, pain occurred before jaundice. We were able to ascertain the order of appearance of these two symptoms in 26 of our 60 patients with pain but were unable to draw any useful diagnostic conclusions. Among 18 patients with biliary obstruction and pain, the pain preceded the jaundice in 6 cases and coincided with it in 12. Among 8 patients with hepatitis and pain, the pain preceded the jaundice in 3 instances, coincided with it in 3 and followed it in 2.

Absence of pain as a characteristic of obstructive jaundice due to malignant tumors versus the presence of pain as a characteristic of obstructive jaundice due to choledocholithiasis was at one time emphasized more than it has been since the publication of several papers dealing with this subject.[8] In our series the jaundice was painless in 43 per cent of patients with carcinoma of the pancreas, in 42 per cent of patients with hepatitis and in 40 per cent of patients with stone in the common bile duct. Obviously the absence of pain offers no help in the differential diagnosis of jaundice.

Pruritus: Itching is a common symptom of jaundice which is often considered to favor the diagnosis of biliary obstruction.[9] In this study pruritus was of no diagnostic significance, since patients complaining of it had parenchymatous jaundice in 53 per cent of cases and obstructive jaundice in 47 per cent of cases. In Lichtman's experience [2] itching was also independent of the type and severity of jaundice.

II A. *Physical Observations of Value.*—Hepatomegaly: Among the physical observations of value (table 3), palpable enlargement of the liver was present in 59 per cent of our patients and was found with equal frequency in cases of obstructive and of parenchymatous jaundice. Decided hepatomegaly with the edge of the liver 7 cm. or more below the costal margin was present three times more frequently in jaundice associated with parenchymatous disease than in obstructive jaundice. Among patients with obstructive jaundice

5. Flood, C. A.; Seegal, D.; Spock, B., and Loeb, R. F.: The Differential Diagnosis of Jaundice, Am. J. M. Sc. **185**: 358 (March) 1933.
6. Berk, E. J.: Diagnosis of Carcinoma of the Pancreas, Arch. Int. Med. **68**: 525 (Sept.) 1941.
7. Weiss,[4] Flood, Seegal, Spock and Loeb.[5]
8. (*a*) Rives, J. D.; Romano S. A. and Sandifer, F. M.: Carcinoma of the Pancreas, Surg., Gynec. & Obst. **65**: 164 (Aug.) 1937. (*b*) Weir, J. F., and Partch, W. T.: The Relationship of Pain to Jaundice, Ann. Int. Med. **4**: 1509 (June) 1931. (*c*) Flood, Seegal, Spock and Loeb.[5] Berk.[6]
9. Murchism, C.: Clinical Lectures on Diseases of the Liver, London, Longmans, Green & Co., 1885, p. 702. Snell, A. M., and Keyes, H. C.: Pruritus of Jaundiced Patients: Its Incidence and Treatment, M. Clin. North America **16**: 1455 (May) 1933.

and enlargement of the liver a large majority (73 per cent) of cases were due to carcinoma of the pancreas. It appears that the rapidly progressive and complete obstruction which results from this cause is more likely to produce enlargement of the liver than is the incomplete and often intermittent obstruction due to choledocholithiasis. Data in the literature on the size of the liver in various diseases which lead to jaundice vary considerably.[10] The hazards of attaching too much significance to hepatic enlargement have been shown by Rives, Romano and Sandifer,[8a] who were able to confirm at autopsy the clinical finding of hepatomegaly in less than one half of their cases. One of us (T. L. A.) had a patient in whom the lower edge of the liver, which was subsequently proved to be normal, was pushed down to the level of the umbilicus by advanced pulmonary emphysema.

Ascites: Free fluid in the abdomen is an observation of great diagnostic value. Ninety-one per cent of our patients with ascites had parenchymatous jaundice, and in 76 per cent of cases it was due to cirrhosis of the liver. Sixty nine per cent of our patients with hepatic cirrhosis and jaundice had clinically demonstrable ascites. Studies by other clinicians are in agreement with these observations.[11]

Collateral Subcutaneous Venous Circulation: Ninety-one per cent of patients with collateral subcutaneous venous circulation had parenchymatous jaundice. In 82 per cent of cases it was due to cirrhosis of the liver. However, only 38 per cent of patients with cirrhosis and jaundice and only 47 per cent of patients with cirrhosis, jaundice and ascites showed evidence of collateral circulation. In the literature collateral circulation is reported in from 23 per cent to 76 per cent of patients with hepatic cirrhosis.[11b] The conclusion appears justified that the presence of collateral circulation strongly points to the existence of parenchymatous jaundice, which in most cases will be due to cirrhosis of the liver.

Angiomas: Angiomas of the acquired arterial spider type were found in this series only in patients with parenchymatous jaundice due, with 1 exception, to cirrhosis of the liver. However, Bean[12] in a series of 232 patients with hepatic disease also found such angiomas in 2 instances of obstructive jaundice. Eighty per cent of his patients with angiomas were suffering from cirrhosis of the liver. The observation of acquired spider angiomas, then, is good evidence of parenchymatous jaundice, which in a large majority of cases is due to hepatic cirrhosis.

Palpable Gallbladder: In 89 per cent of our patients with a palpable gallbladder the jaundice was due to carcinoma of the pancreas and in 11 per cent to choledocholithiasis. On the other hand, only 35 per cent of our patients with carcinoma of the pancreas had a clinically enlarged gallbladder. These figures are generally in accord with those in the literature.[13] Flood[8] also occasionally found a palpable gallbladder in patients with catarrhal jaundice. Therefore, notwithstanding some exceptions, Courvoisier's law is still valid when a palpable gallbladder is present.

Splenomegaly: A palpably enlarged spleen was associated in this series with parenchymatous jaundice in 60 per cent of cases, with hemolytic jaundice in 14 per cent and with obstructive jaundice in 26 per cent. Therefore, 3 of 4 patients with splenomegaly had nonsurgical types of jaundice. According to published data splenomegaly is mainly present in cirrhosis of the liver and in acute hepatitis but occasionally also in choledocholithiasis with cholangitis and in carcinoma of the pancreas.

II B. *Physical Observations of Little Value.*—Bradycardia: Slowing of the pulse rate figures prominently in most textbook discussions on jaundice. Most authors find it predominantly in catarrhal jaundice.[14] On the other hand, MacKenzie[15] stated that he never met with bradycardia in jaundice. We observed a significant slowing of the pulse rate in only 2 patients in this series and therefore cannot consider it of any diagnostic help.

Fever: Low grade, chronic fever was present in 39 per cent of cases in this series. It was observed with approximately equal frequency in cases of obstructive and of parenchymatous jaundice. Other authors reported approximately the same incidence of low grade fever in patients with jaundice.[16] One of these reports has stated that patients with carcinoma of the pancreas seldom have any fever.

TABLE 4.—*Laboratory Tests of Value in the Differential Diagnosis of Jaundice*

	Obstructive Jaundice, %	Carcinoma, %	Parenchymatous Jaundice, %	Cirrhosis, %
Gastrointestinal series	..	(46)*	..	(36)
Serum proteins	25	..	75	71
Intravenous galactose test				
Positive	(3)	..	(73)	..
Negative	(97)	..	(27)	..
Response to vitamin K				
Positive	(89)	..	(6)	..
Negative	(11)	..	(94)	..

* Figures in parentheses indicate the percentage of patients with a given diagnosis in whom this observation was made.

Hepatic Tenderness: A tender liver was found in only 13 per cent of our patients but was of some diagnostic significance when present, since in fully 10 per cent of the cases it was due to parenchymatous disease of the liver. Reports in the literature[17] indicate a higher incidence of hepatic tenderness in jaundice than we found and state that it occurs most frequently in acute hepatitis, less frequently in choledocholithiasis, and seldom in cirrhosis of the liver or in carcinoma of the pancreas.

III A. *Laboratory Tests of Value.*—Gastrointestinal Series: An analysis of the value of laboratory tests (table 4) showed that roentgenologic studies of the gastrointestinal tract can be useful in the differential diagnosis of jaundice in the following manner: (1) by suggesting the presence of a pancreatic carcinoma when widening of the duodenal loop, partial obstruction of the third part of the duodenum or deformity of the pylorus

10. Meyer, K. A., and Steigman, K.: Surgical Jaundice—Diagnostic Considerations, Surg., Gynec. & Obst. **67**: 640 (Nov.) 1938. Lichtman.[3] Berk.[9]

11. (a) Fleming, R. G., and Snell, A. M.: Portal Cirrhosis with Ascites—An Analysis of 200 Cases with Special Reference to Diagnosis and Treatment, Am. J. Digest. Dis. **9**: 115 (April) 1942. (b) Patek and Post,[1b] Ratnoff and Patek.[1c]

12. Bean, W. B.: The Cutaneous Arterial Spider: A Survey, Medicine **24**: 243 (Sept.) 1945.

13. Weiss.[4] Berk.[9]

14. Rolleston, H.: Diseases of the Liver, Gall Bladder and Bile Ducts, London, The Macmillan Company, 1929. Eppinger, H., in Kraus, F., and Brugsch, T.: Spezielle Pathologie und Therapie innerer Krankheiten, Berlin, Urban & Schwarzenberg, 1920, vol. 62. Hoagland, C. L., and Shank, R. E.: Infectious Hepatitis—A Review of Two Hundred Cases, J. A. M. A. **130**: 615 (March 9) 1946. Weiss.[4]

15. MacKenzie, J.: The Study of the Pulse, London, Y. T. Pentland, 1902, p. 134.

16. Ratnoff and Patek.[1c] Flood, Seegal, Spock and Loeb.[8]

17. Ratnoff and Patek.[1c] Weiss.[4] Flood, Seegal, Spock and Loeb.[8]

or duodenum due to infiltration by tumor are present; (2) by indicating the probability of hepatic cirrhosis when varices are found in the esophagus, and (3) by calling attention to the possibility of metastatic involvement of the extrahepatic or intrahepatic biliary ducts when a primary tumor of the gastrointestinal tract, usually of the stomach, is discovered.

In our series characteristic changes in the duodenum were found in 45 per cent of patients with cancer of the pancreas. Esophageal varices were detected in 36 per cent of patients with cirrhosis of the liver and jaundice. Berk [6] reported positive roentgenologic observations in 37 per cent of 367 collected cases of pancreatic carcinoma.

Serum Proteins: A serum albumin of 3.5 Gm. per hundred cubic centimeters or less occurred with equal frequency in patients with obstructive and with parenchymatous jaundice. On the other hand, 75 per cent of patients who had a low serum albumin level with a high serum globulin determination were suffering from parenchymatous jaundice, usually due to cirrhosis of the liver. The importance of hyperglobulinemia in addition to the hypoalbuminemia for the differential diagnosis of jaundice has not been stressed by writers on this subject.[18]

Intravenous Galactose Test: The value of galactose in the differential diagnosis of jaundice lies in the observation that, unlike most other functions of the liver, the ability to metabolize galactose is impaired relatively little by obstructive jaundice of even several months' duration. In a previous paper [19] one of us (T. L. A.) called attention to the unreliable results with the conventional oral galactose test, which is influenced not only by the ability of the liver to metabolize galactose but by the rates of intestinal absorption and renal excretion of this sugar. At the same time there was described a method of administering galactose intravenously and of measuring the unused portion of galactose in the venous blood at the end of the test, which rendered the galactose test more useful for the differentiation of obstructive from parenchymatous jaundice. In this paper, 82 per cent of 33 unselected patients with obstructive jaundice of less than six months' duration had less than 20 mg. of galactose per hundred cubic centimeters in the blood seventy-five minutes after the intravenous injection of 1 cc. of a 50 per cent solution of galatose per kilogram of body weight, while 81 per cent of 26 unselected patients with parenchymatous jaundice had more than this amount of galactose in the blood.

In the present series all patients with uncomplicated obstructive jaundice due to stone in the common bile duct had less than 20 mg. of galactose per hundred cubic centimeters in the blood at the end of the test. Six patients with choledocholithiasis and superimposed biliary cirrhosis had higher values for galactose. All the latter patients had a long history of repeated attacks of biliary colic associated with jaundice, chills and fever; hence, it was easy to distinguish this group clinically from patients with uncomplicated obstructive jaundice. In all these patients the clinical diagnosis of biliary cirrhosis was confirmed by operative procedures and in half of them it was also confirmed by biopsy of the liver.

18. Post, J., and Patek, A. J.: Serum Proteins in Cirrhosis of the Liver, Arch. Int. Med. **69**: 67 (Jan.) 1942. Snell, A. M.: The Plasma Proteins and Liver Disease, Am. J. Digest. Dis. **4**: 258 (June) 1938.

19. Bassett, A. M.; Althausen, T. L., and Coltrin, G. C.: A New Galactose Test for the Differentiation of Obstructive from Parenchymatous Jaundice, Am. J. Digest. Dis. **8**: 432 (Nov.) 1941.

In all but 1 patient with uncomplicated obstructive jaundice due to carcinoma of the pancreas the blood galactose level was under 20 mg. per hundred cubic centimeters. In the 1 exception the borderline figure of 25 mg. per hundred cubic centimeters was obtained. Three patients with carcinoma of the pancreas had higher values for galactose. Two of them also had cirrhosis of the liver, as shown by operation and biopsy, and the third patient had massive metastatic growths in the liver. Two patients with jaundice due to benign postoperative stricture of the common duct had a normal galactose tolerance.

In summary, practically all (97 per cent) patients with uncomplicated obstructive jaundice were identified correctly by the intravenous galactose test. If we are to include in the group of obstructive jaundice the cases complicated by hepatic cirrhosis and the case with massive metastases to the liver, we still get a correct answer in 78 per cent of the cases. The mean galactose blood level of all patients with obstructive jaundice was 15 mg. per hundred cubic centimeters.

Seventy-nine per cent of patients with cirrhosis of the liver had more than 20 mg. of galactose per hundred cubic centimeters in the blood. All these patients had an icterus index over 50 units. Twenty-one per cent of patients with cirrhosis of the liver had a galactose level of less than 20 mg. per hundred cubic centimeters in the blood, and all of them had an icterus index under 50 units. In addition to the mild degree of icterus, which usually robs the case of urgency because surgical intervention is not contemplated, in most of the latter cases the presence of other signs which pointed to parenchymatous hepatic disease, such as ascites, spider angiomas and cutaneous collateral circulation, made the diagnosis clear.

Seventy-three per cent of patients with acute hepatitis had a galactose blood level in excess of 20 mg. per hundred cubic centimeters. Twenty-seven per cent had less than 20 mg. of galactose per hundred cubic centimeters in the blood. In the latter group, in all but 1 case the hepatitis was mild (with an icterus index under 50 units) or of short duration and was undergoing rapid improvement when the test was performed.

Two patients with acute yellow atrophy of the liver had a striking inability to metabolize galactose. Their blood galactose levels were 129 and 145 mg. per hundred cubic centimeters. The highest figure for galactose in the blood which we observed in acute hepatitis with recovery was 116 mg., and the highest figure obtained in cirrhosis of the liver was 92 mg., per hundred cubic centimeters. This limited experience suggests that galactose levels over 125 mg. per hundred cubic centimeters are of grave prognostic significance. This information is of all the more value, since the 2 instances of extremely high values for galactose were obtained by us before other indications of the gravity of the situation appeared and while the patients had few subjective complaints. In 1 of these cases the outcome of the test was instrumental in bringing a close relative from a distant part of the country to the patient's bedside before death occurred.

In summary, 77 per cent of all patients with parenchymatous jaundice were identified correctly by means of the intravenous galactose test. Were we to exclude from our material patients with mild jaundice (with an icterus index under 50 units) or with jaundice lasting less than a week, the accuracy of the test in parenchymatous jaundice would rise to 98 per cent.

The mean galactose level of the blood was 56 mg. per hundred cubic centimeters. King and Aitken [20] as well as Maclagan [21] obtained comparable results with the intravenous galactose test. Combining the results of the intravenous galactose test in all cases of jaundice, it is seen that the outcome of the test alone made the differentiation between obstructive and parenchymatous jaundice in our series in 3 of 4 cases. When certain simple additional clinical data are taken into consideration, it becomes possible to determine correctly the type of jaundice in almost all cases.

Prothrombin Response to Vitamin K: Maintenance of a normal prothrombin level in the plasma is one of the functions of the liver. This function can be fulfilled only in the presence of an adequate supply of vitamin K from the intestine. Obstructive jaundice lowers the prothrombin level by interfering with the intestinal absorption of vitamin K and by creating a vitamin K deficiency. Such a deficiency hypoprothrombinemia is corrected rapidly (often in six hours) by the parenteral administration of vitamin K. Parenchymatous jaundice produces hypoprothrombinemia by interfering with the ability of the liver to form prothrombin. Consequently in the latter the administration of vitamin K either does not raise the prothrombin level at all or does so only slowly. This difference, as has been repeatedly pointed out,[22] can be used for the differential diagnosis between obstructive and parenchymatous jaundice.

In the present study the prothrombin level was determined by the method of Quick.[23] The patient was then given an injection of the contents of one ampule of a vitamin K preparation, menadione sodium bisulfite ("hykinone" Abbott), and the prothrombin level was determined again twenty-four to forty-eight hours later. Elevation of the prothrombin level was considered significant only if the original level was 70 per cent or less and the increase 20 per cent or more.

Among our patients with obstructive jaundice 89 per cent responded with a significant increase of an initially low prothrombin concentration. Among those who failed to respond superimposed biliary cirrhosis accounted for one half of the cases. Allen [24] also found that the presence of cholangitis with fever impaired the prothrombin response. In the group of our patients with parenchymatous jaundice 94 per cent showed no increase in the prothrombin level. These figures indicate a satisfactory accuracy on the part of the prothrombin response to vitamin K in the differentiation of the obstructive from the parenchymatous type of jaundice. There was also excellent correlation between the results of the intravenous galactose test and the response of prothrombin to vitamin K.

III B. *Laboratory Tests of Little Value.*—Cholecystography: Cholecystography was of limited value in differentiating between cases of obstructive and of parenchymatous jaundice in this series. It can be said that normal visualization of the gallbladder tends to rule out cholecystic disease. However, since the gallbladder was not visualized in 77 per cent of our cases of jaundice due to cholecystic disease, acute hepatitis, hepatic cirrhosis and benign or malignant obstruction of the common duct, this procedure was of little value in differential diagnosis.

Intravenous Hippuric Acid Test: The test based on the ability of the liver to provide aminoacetic acid for the formation of hippuric acid from sodium benzoate has proved itself a sensitive general liver function test. In the series here reported excretion of sodium benzoate was impaired in 82 per cent of patients with obstructive jaundice, regardless of the duration of jaundice and in 90 per cent of patients with parenchymatous jaundice. These figures correspond to our previously reported observations [19] and to the experience of other workers.[25] They indicate that the test is so sensitive that it records the relatively slight hepatic injury caused by regurgitation of bile in obstructive jaundice on a par with the more serious injury incident to various forms of hepatitis. For this reason it is not suitable for differentiation of these two types of jaundice.

Other Liver Function Tests: Several other tests, including the qaulitative van den Bergh, total cholesterol, cephalin flocculation, alkaline phosphatase and roughly quantitative urobilinogen determinations by the method of Wallace and Diamond,[26] were performed in a portion of the cases included in this series. Except in isolated instances we found them of no great value in differentiation between cases of obstructive and of parenchymatous jaundice. This was also the reported experience of other investigators.[27]

EXPECTANT MANAGEMENT OF JAUNDICE

In any sufficiently large series of patients with jaundice in spite of the best efforts of the clinician there is likely to remain a small residual number of cases in which the most meticulous history, careful physical examination and extensive laboratory investigation fail to produce a satisfactory identification of the type of jaundice present. In such cases the attending physician can substitute intelligent management for a definite diagnosis. Such management consists of supportive and symptomatic treatment for a period of two months from the onset of jaundice and serial determinations of bilirubinemia by means of the icterus index or the quantitative van den Bergh test at intervals of two weeks. If at the end of this period there is no consistent diminution in the intensity of jaundice, exploratory operation should be advised.

It has been shown that most cases of acute hepatitis begin to clear up before the end of two months. Most patients with subacute or acute atrophy of the liver will also either show definite improvement or die during this period. This leaves practically only patients with obstructive jaundice who can be either cured by removal of a benign obstruction from the common bile duct or relieved by a palliative anastomosis of the gallbladder to the duodenum or stomach if the obstruction is due to a malignant tumor.

20. King, E. J., and Aitken, R. S.: An Intravenous Galactose Tolerance Test, Lancet **2**: 543 (Nov. 2) 1940.
21. Maclagan, N. F.: Laboratory Tests in the Diagnosis of Liver Disease, Brit. M. J. **2**: 363 (Sept. 14) 1944.
22. (*a*) Allen, J. G.: The Diagnostic Value of Prothrombin Response to Vitamin K Therapy as a Means of Differentiating Between Intrahepatic and Obstructive Jaundice, Internat. Abstr. Surg. **76**: 401 (May) 1943. (*b*) Lord, J. W., and Andrus, W. D.: Differentiation of Intrahepatic and Extrahepatic Jaundice, Arch. Int. Med. **68**: 199 (Aug.) 1941. (*c*) Olwin, J. H.: Differentiation of Surgical Jaundice from Severe Damage of Liver, Arch. Surg. **43**: 633 (Oct.) 1941. Allen, J. G., and Julian, O. C.: Prothrombin and Hepatic Function, Arch. Surg. **45**: 691 (Nov.) 1942. Lucia, S. P., and Aggeler, P. M.: The Influence of Liver Damage on the Plasma Prothrombin Concentration and the Response to Vitamin K, Am. J. M. Sc. **201**: 326 (March) 1941.
23. Aggeler, P. M.; Howard, J.; Lucia, S. P.; Clark, W., and Astaff, A.: Standardization of the Quick Prothrombin Test, Blood **1**: 220 (May) 1946.
24. Allen, J. G.: The Clinical Value of the Functional Tests of the Liver, Gastroenterology **3**: 490 (Dec.) 1944.
25. Snell, A. M., and Plunkett, J. E.: The Hippuric Acid Test for Hepatic Function—Its Relation to Other Tests in General Use, Am. J. Digest. Dis. **2**: 716 (Feb.) 1936. Lord and Andrus.[22b]
26. Wallace, G. B., and Diamond, J. S.: The Significance of Urobilogen in Urine as Test of Liver Function, Arch. Int. Med. **35**: 698 (June) 1925.
27. Pohle, F. J., and Stewart, J. K.: The Cephalin-Cholesterol Flocculation Test as an Aid in the Diagnosis of Hepatic Disorders, J. Clin. Investigation **20**: 241 (March) 1941. Cantarow, A., and Nelson, J.: Serum Phosphatase in Jaundice, Arch. Int. Med. **59**: 1045 (June) 1937. Lord and Andrus.[22b]

The objection to an exploratory operation before the end of two months is the high operative mortality of patients with hepatitis, especially when hypoprothrombinemia is present. On the other hand, expectant treatment for two months in the presence of obstructive jaundice, especially when supportive treatment is used, causes relatively little harm, since even complete obstruction of the common duct is tolerated fairly well for several months,[28] while obstruction permitting the leakage of 15 to 20 per cent of the normal amount of bile into the intestine is compatible with fair health indefinitely.[29] It is also useful to recall here, as pointed out by Watson,[30] that obstruction of the common bile duct due to gallstones is practically never complete. Complete obstruction of the common bile duct is usually caused by carcinoma of the head of the pancreas or of the bile ducts, and the prognosis is definitely poor in any case. Even with these precautions, on infrequent occasions a patient with prolonged hepatitis may be subjected to exploratory laparotomy. However, this risk must be accepted in order to avoid the development of biliary cirrhosis in case of further delay in a far greater number of patients with obstructive jaundice, especially when the obstruction is of a benign nature.

At present with the aid of the intravenous galactose test and the prothrombin response to vitamin K we find it necessary only in rare instances to resort to the expectant management of patients with jaundice. However, before the advent of these two tests one of us (T. L. A.) had considerable experience with such management, and the results were gratifying.

SUPPORTIVE AND SYMPTOMATIC TREATMENT OF JAUNDICE

1. The diet should be high in protein (125 Gm.) and carbohydrate (360 Gm.) and low in fat (60 Gm.). Alcohol must be excluded totally and meat limited to one meal a day. If the patient is unable to eat sufficient food at meal time, interval feedings should be instituted. Intravenous infusions of dextrose and amino acids are useful only when for some reason, such as vomiting, the patient is unable to take sufficient nourishment orally.

2. A generous supplement of vitamins A and B complex, ascorbic acid, vitamins D and K should be prescribed.

3. Hypochromic anemia, if present, should be treated with preparations of iron. For hyperchromic macrocytic anemia, liver extract or folic acid should be administered.

4. Calcium is prescribed to help prevent osteoporosis.

5. For itching, 0.5 mg. of ergotamine tartrate can be injected subcutaneously once a day for several days. Advanced age and weak or absent pulsations of the arteries of the foot are contraindications to this drug.

6. Insulin should be given only for coexisting diabetes mellitus.

7. Salts of bile acids are of questionable value.

COMMENT

The chief data in the history, physical examination and laboratory study which are of diagnostic value in jaundice have been discussed. The data of little differential value have also been mentioned.

In many patients with jaundice the correct diagnosis can be made from the history and physical examination alone. For example, a middle-aged patient in whom, after a prolonged period of malaise and nausea, there develops jaundice with decided pain in the right upper quadrant referred to the back, pruritus and low grade fever may be suffering from either obstructive or parenchymatous jaundice. In such cases, an additional history of alcoholism would point to cirrhosis of the liver or hepatitis; male sex with definite progressive loss of weight would strongly suggest carcinoma of the pancreas; a history of cholecystic disease, of biliary colic or of chills and fever would favor a diagnosis of stone in the common bile duct. A physical examination may reveal a palpable gallbladder, which would suggest carcinoma of the pancreas, or disclose one or more of the following signs: extremely large liver, ascites, collateral subcutaneous circulation, spider angiomas or splenomegaly, which would point to parenchymatous jaundice and probably cirrhosis of the liver. However, in many instances the history and physical examination do not yield information of a decisive nature. The laboratory study may then answer the crucial question whether the jaundice is due to extrahepatic block and surgical intervention is necessary or whether it is due to parenchymatous disease of the liver and medical treatment alone is indicated. The gastrointestinal series of tests may furnish presumptive evidence of carcinoma of the pancreas or of hepatic cirrhosis. A low serum albumin level with a high serum globulin determination favors parenchymatous jaundice. However, in our experience final recourse is usually to liver function tests. Here it must be remembered that liver function tests involving the ability of the liver to excrete certain substances, such as dyes or bilirubin, are useless in patients with jaundice. It is also well to bear in mind that the most sensitive liver function tests are not always the best for a given purpose. For example, the high sensitivity of the hippuric acid test makes it useless for the differential diagnosis of jaundice. The most decisive factor in differentiation between obstructive and parenchymatous jaundice is the ability of the liver to metabolize galactose and to produce prothrombin following an injection of vitamin K. If these functions of the liver are not impaired, or are impaired only slightly, the case is in the domain of the surgeon. If they are greatly impaired the case is almost always strictly a medical problem. If the results are inconclusive or conflicting, supportive treatment and serial determinations of bilirubinemia are indicated for a period of two months from the onset of jaundice. During this period the large majority of patients with parenchymatous disease of the liver are either on the way to recovery or have died from acute yellow atrophy of the liver. Those remaining unimproved, with few exceptions, have obstructive jaundice and should be subjected to exploratory laparotomy.

SUMMARY

1. One hundred cases of jaundice which presented diagnostic problems and in which the diagnosis was confirmed by operation, autopsy or clinical course are analyzed.

2. The relative value of data obtained from the clinical history, physical examination and laboratory study in the differentiation between obstructive and parenchymatous jaundice is pointed out.

3. The usefulness of the intravenous galactose test is demonstrated by the fact that, when taken alone, it

28. Wangensteen, O. H.: How Long May Man Live with Obstructive Jaundice? J. A. M. A. **90**: 1683 (May 26) 1928.
29. Whipple, A. H.: The Origin and Significance of the Constituents of the Bile, Physiol. Rev. **2**: 440 (July) 1922.
30. Watson, C. J.: Studies of Urobilinogen: III. The Per Diem Excretion of Urobilinogen in the Common Forms of Jaundice and Disease of the Liver, Arch. Int. Med. **59**: 206 (Feb.) 1937

made the differentiation between obstructive and parenchymatous jaundice in 3 out of 4 cases. When taken in conjunction with certain simple additional clinical data, this test made it possible to identify the type of jaundice in almost all cases.

4. The diagnostic accuracy of the prothrombin response to vitamin K is shown by the fact that it was present in 9 of 10 patients with obstructive jaundice and was absent in the same proportion of patients with parenchymatous jaundice.

5. A program is outlined for the effective handling of the small number of patients with jaundice in whom no definite diagnosis as to the type of jaundice can be made in spite of all efforts.

THE DIAGNOSIS OF INFECTIOUS HEPATITIS

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Interest in infectious hepatitis has been greatly increased by the large number of cases occurring in our armed forces during the war. Whether there has been a corresponding rise in incidence among civilians in the United States is not known since it is not generally reportable; but it is worthy of note that a significant rise in the civilian rate has been reported in several other countries.[1] We have already pointed out that this disease is more serious than was previously thought and have emphasized the importance of its prompt recognition and proper treatment.[2] However, the diagnosis of sporadic cases, especially the nonicteric types, offers difficulties not encountered during epidemics. Because of these difficulties we feel justified in presenting a detailed report of the practical problems involved in the clinical diagnosis.

MATERIAL AND METHODS

Our experience, gained largely in the army, is based on the observation of approximately 8,000 cases of infectious hepatitis, of which 2,000 were systematically studied. These include postvaccinal hepatitis seen in 1942, epidemic hepatitis in the Mediterranean theater,[2a, b] a recent series of varied types studied in this country in an army general hospital and cases seen in civilian practice since the war. Almost all the available methods for the study of hepatic function have been extensively employed. The procedures referred to in this paper are as follows. Bilirubinuria has been determined by the methylene blue test[2a] and by Hawkinson, Watson and Turner's so-called strip test.[3] The serum bilirubin has been measured by the acetone icterus index[4] or by Ducci and Watson's modification of the van den Bergh test.[5] Watson, Schwartz, Sborov and Bertie's new quantitative method has been used for urobilinogen.[6] Cholesterol esters have been determined by the Sperry and Schoenheimer technic.[7] Standard methods have been employed for other tests.[2a, b]

GENERAL CONSIDERATIONS

At the outset it must be recognized that there is no specific test for this disease. So far it has proved impossible to develop an immunologic or bacteriologic method for specific identification. Acute hepatic injury may be caused not only by the virus of infectious hepatitis but also by other infectious agents, notably virus pneumonia, infectious mononucleosis, acute brucellosis, amebiasis and malaria, as well as by certain hepatotoxins such as carbon tetrachloride, arsenic, phosphorus, cinchopen and probably the sulfonamide drugs.[8] However, in the absence of other satisfactory etiologic explanation and in the presence of a compatible clinical picture it appears safe to assume that acute hepatitis is almost always due to the virus of infectious hepatitis or a closely allied strain.

The clinical course of this disease is characterized by an acute febrile nonicteric prodromal period lasting about seven days followed by an acute icteric stage of about three weeks' duration. Frequently, clinical jaundice fails to develop after the febrile prodromes, and this is referred to as acute hepatitis without jaundice.[2a] Finally, about 10 per cent of acute cases progress to so-called chronic hepatitis.[2b] Since the diagnostic problems, as well as the diagnostic criteria and methods, are different in each of these stages or types, it is necessary to discuss them separately.

Of general diagnostic value is a history of other cases of the disease in the family or neighborhood or a history of exposure to blood or blood products parenterally. In this regard transfusions, plasma, convalescent serum[9] or any type of hypodermic injection[10] in the previous four months is a possible source

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1. (*a*) Stowman, K.: The Epidemic Outlook in Europe, J. A. M. A. **128:** 185 (May 19) 1945. (*b*) Havens, W. P., Jr.: Infectious Hepatitis in the Middle East: Clinical Review of Two Hundred Cases Seen in Military Hospitals, ibid. **126:** 17 (Sept. 2) 1944; correction, ibid. **126:** 782 (Nov. 18) 1944.

2. (*a*) Barker, M. H.; Capps, R. B., and Allen, F. W.: Acute Infectious Hepatitis in the Mediterranean Theater, Including Acute Hepatitis Without Jaundice, J. A. M. A. **128:** 997 (Aug. 4) 1945; (*b*) Chronic Hepatitis in the Mediterranean Theater: A New Clinical Syndrome, ibid. **129:** 653 (Nov. 3) 1945. (*c*) Capps, R. B., and Barker, M. H.: The Management of Infectious Hepatitis, Ann. Int. Med. **26:** 405, 1947.

3. Hawkinson, V.; Watson, C. J., and Turner, R. H.: A Modification of Harrison's Test for Bilirubin in the Urine Especially Suited for Mass and Serial Usage, J. A. M. A. **129:** 514 (Oct. 13) 1945.

4. Newburger, R. A.: Determination of the Icteric Index by the Acetone Method, J. Lab. & Clin. Med. **22:** 1192 (Aug.) 1937.

5. Ducci, H., and Watson, C. J.: The Quantitative Determination of the Serum Bilirubin with Special Reference to the Prompt Reacting and the Chloroform Soluble Types, J. Lab. & Clin. Med. **30:** 293 (April) 1945.

6. Watson, C. J.; Schwartz, S.; Sborov, V., and Bertie, E.: Studies of Uroporphyrins: A Simple Method for the Quantitative Recording of the Ehrlich Reaction as Carried Out with Urine and Feces, Am. J. Clin. Path. **14:** 605 (Dec.) 1944.

7. Schoenheimer, R., and Sperry, W. M.: A Micromethod for the Determination of Free and Combined Cholesterol, J. Biol. Chem. **106:** 745 (Sept.) 1934.

8. Watson, C. J.: The Effect of Sulphanilamide upon the Liver, editorial, Surgery **5:** 616 (April) 1939. Menten, M. L., and Andersch, M. A.: Hepatic Damage Associated with Sulphonamide Therapy in Infants and Children: Morphologic Pathology, Ann. Int. Med. **19:** 609 (Oct.) 1943. Herbert, P. A., and Scaricaciottoli, T. M.: Diffuse Hepatic Necrosis Caused by Sulphadiazine, Arch. Path. **40:** 94 (Aug.) 1945.

9. Murphy, H. M.: Transmission of Infectious Hepatitis by Blood Transfusion, Gastroenterology **5:** 449 (Dec.) 1945. Grossman, S., and Saward, E. W.: Homologous Serum Jaundice Following Administration of Commercial Pooled Plasma, New England J. Med. **234:** 181 (Feb. 7) 1946. Beeson, P. B.; Chesney, G., and McFarlan, A. M.: Hepatitis Following Injection of Mumps Convalescent Plasma: Reports from American Red Cross-Harvard Field Hospital Unit; Use of Plasma in Mumps Epidemic, Lancet **1:** 814 (June 24) 1944. Rappaport, E. M.: Hepatitis Following Blood or Plasma Transfusions: Observations in Thirty-Three Cases, J. A. M. A. **128:** 932 (July 28) 1945.

10. Syringe Transmitted Hepatitis, editorial, J. A. M. A. **129:** 278 (Sept. 22) 1945. Capps, R. B.; Sborov, V., and Scheiffley, C. S.: A Syringe Transmitted Epidemic of Infectious Hepatitis, with Observations Regarding the Incidence of Infectious Donors, to be published.

of infection. At the same time it is desirable to rule out exposure to such common substances as carbon tetrachloride, chloroform, arsenic and various commercial solvents. Although such exposure may constitute the sole cause of an acute hepatitis it may also act as a secondary aggravating factor in what is primarily an infectious hepatitis.

TABLE 1.—*Diagnostic Significance of Observations in the Prodromal or Preicteric Stage of Infectious Hepatitis*

Presumptive Observations	Suggestive Observations
1. Liver large and tender	1. Liver tender but not enlarged
2. Hyperbilirubinemia	2. Splenomegaly
3. Bilirubinuria	3. Low cervical adenopathy
	4. Leukopenia with atypical lymphocytes
	5. Other liver function tests moderately to strongly positive

PRODROMAL STAGE

The diagnosis of infectious hepatitis in the prodromal stage is infrequently more than presumptive. The symptomatology cannot be clearly distinguished from that of other acute febrile illnesses. Furthermore, the presence of fever introduces the possibility of transitory secondary hepatic changes which diminish the significance of liver function tests. The characteristic feature of infectious hepatitis is that the distinctive physical and laboratory observations persist for some days after the abatement of fever and usually become more pronounced.

The diagnosis should be suspected when anorexia and nausea with or without vomiting are prominent and persistent. Moderately severe headache, a few loose stools with excessive flatus, and distress in the right upper quadrant of the abdomen are also common and important symptoms. Although fever as high as 104 F. may be present for several days, shaking chills are seldom seen. In the homologous serum type of hepatitis and in about 10 per cent of cases of the epidemic hepatitis type there is an insidious and relatively afebrile onset.

The more important physical and laboratory diagnostic observations are listed in table 1. We do not believe that a presumptive diagnosis should be made at the prodromal stage without at least one of the criteria in that column being present. Unfortunately, all three are often absent. It is to be noted that the appearance of bilirubin in the urine is not only an early observation but may occur without abnormality in the serum bilirubin or in the presence of such a small rise in the prompt direct type of serum bilirubin that the icterus index is not significantly altered.[11]

If other liver function tests are rather strongly positive this fact is decidedly suggestive of primary hepatitis. The flocculation and the quantitative urine urobilinogen tests are the most helpful and practical in this respect. Moderate elevation of the latter, however, must be discounted in the presence of fever. It is ordinarily not practical to use the sulfobromophthalein sodium test at this point, although a moderate degree of dye retention is significant.

11. (*a*) Neefe, J. R.; Stokes, J., Jr.; Rheinhold, J. G., and Lukens, F. D. W.: Hepatitis Due to the Injection of Homologous Blood Products in Human Volunteers, J. Clin. Investigation **23**: 836 (Sept.) 1944. (*b*) Capps, R. B.: Unpublished data.

The diagnosis is seldom established until after the initial febrile period has passed and either frank jaundice appears or positive observations persist.

ACUTE STAGE

The diagnosis of infectious hepatitis in the acute icteric stage is relatively easy and is adequately discussed in all standard texts. Acute hepatitis without jaundice is, however, a relatively new concept.[2a] The diagnosis is based on the persistence of the prodromal observations after the subsidence of fever. Symptoms of decided lassitude, anorexia, mild looseness of the stools, intestinal cramps, headache and aching in the right upper quadrant of the abdomen and right lumbar region are present.

In the absence of fever, results of liver function tests have increased significance. As shown in table 2, bilirubinemia, bilirubinuria or moderate sulfobromophthalein sodium retention are diagnostic if present. However, the first two are often so transitory that they are missed. A positive flocculation test or quantitative urobilinogen determination associated with characteristic clinical observations are also adequate for diagnosis.

An important point in the history is the characteristic aggravation of symptoms, especially the pain in the right upper quadrant of the abdomen, after physical exertion or jolting activities such as rough automobile rides. Patients that have been exercising and do not have an enlarged tender liver do not have acute hepatitis. On the other hand, the physical examination of patients with acute infectious hepatitis who have been at rest in bed often reveals a normal liver.

CHRONIC HEPATITIS

Chronic hepatitis is a condition which develops in certain instances following acute hepatitis either with or without jaundice.[2b] For prognostic and therapeutic reasons it is of value to distinguish two types, even though they probably represent different phases of the same disease.[12] Chronic active hepatitis is characterized by recurrent bouts of extreme lassitude, easy fatigue, looseness of the stools, intestinal cramps, increased flatus, anorexia, headaches and pain in the right upper quadrant and the right lumbar region. Jaundice may occur. The liver is enlarged and tender. Symptoms and observations are all aggravated by

TABLE 2.—*Diagnostic Significance of Observations in Acute Hepatitis Without Jaundice After the Acute Febrile Prodomes Have Subsided*

The Persistence of Observations Associated with Suitable Symptoms Is Most Significant

Diagnostic Observations	Confirmatory Observations
1. Large tender liver	1. Same physical observations as in prodromal stage
2. Hyperbilirubinemia	2. Leukopenia with atypical lymphocytes
3. Bilirubinuria	3. Other liver function tests only slightly positive
4. Positive sulfobromophthalein sodium excretion test	
5. Other liver function tests at least moderately positive	

12. Capps, R. B., and Barker, M. H.: The Management of Infectious Hepatitis, to be published.

physical exertion or jolting. Inactive hepatitis, on the other hand, is associated with relatively few symptoms and is not aggravated by exercise. Fat intolerance, flatus and moderate ease of fatigability may be present. The liver may be enlarged, but it is not tender. Objective evidence of hepatic dysfunction is obtained from

TABLE 3.—*Diagnostic Observations in Chronic Infectious Hepatitis*

A history of acute infectious hepatitis preferably with jaundice is, of course, essential. In the active form this should be followed by residual or recurrent symptoms, whereas in the inactive form symptoms are minimal or absent.

Chronic Active Hepatitis	Chronic Inactive Hepatitis
1. Tender enlarged liver	1. Normal or enlarged nontender liver
2. Aggravation of symptoms and observations with exercise	2. No relation of observations to exercise
3. Bilirubinemia of prompt direct type	3. Bilirubinemia if present is indirect type
4. Sulfobromophthalein sodium retention or other positive liver function tests only if first two observations in this column are positive	4. Sulfobromophthalein retention or other positive liver function tests static

laboratory procedures. Low grade bilirubinemia of the indirect type may be found.

The diagnostic observations in both the active and inactive forms of chronic infectious hepatitis are shown in table 3. A history of acute hepatitis with jaundice at the onset of the present illness should be obtained. Although the chronic disease not infrequently develops after an acute attack of the nonicteric type, caution must be used in such cases in making a diagnosis since the causation is difficult to establish; a typical febrile relapse with jaundice is probably the most diagnostic observation.[2b]

In the active form of chronic hepatitis the liver should always be tender and enlarged, although exercise may be necessary to make these factors manifest. The exercise tolerance test developed by one of the authors (R. B. C.) is often of the greatest diagnostic value.[13]

Laboratory evidence of hepatic dysfunction does not distinguish between the active and inactive types of the disease, except that strongly positive tests are usually but not necessarily associated with the former. An elevation of the prompt direct type of bilirubinemia is probably the only exception; it always indicates activity, in our experience.

LABORATORY DIAGNOSIS

The most important feature of the laboratory diagnosis of infectious hepatitis is that the value of different procedures varies with the stage of the disease. This is shown in table 4. Perhaps the most striking example is bilirubinuria, one of the best tests early in the disease but of almost no value later on, because of an apparent increase in the renal threshold to bilirubin.[14] Thus it is usually negative even though the serum bilirubin level is still elevated.

Where specialized laboratory facilities are not available the most satisfactory diagnostic methods are the methylene blue or the strip test for bilirubinuria, the acetone icterus index, the sulfobromophthalein sodium dye retention and the quantitative urobilinogen test. These suffice for the average case. If feasible, the addition of either the cephalin cholesterol flocculation or the thymol turbidity test and Ducci and Watson's modification of the van den Bergh[5] is to be much desired. It is best to routinely employ a relatively small number of tests which are frequently repeated and whose significance is well understood rather than to use a large number of confusing procedures.

COMMENT

There can be little doubt that acute and chronic hepatitis due either to the virus of infectious hepatitis or to other etiologic agents is a common condition. As we have previously pointed out,[2a] the liver is probably involved to a greater or less extent in many acute infections. This is particularly true of virus infections, which tend to be systemic rather than localized and usually involve many of the systems of the body. Delayed convalescence may be due in certain instances to unrecognized hepatic pathologic factors. Similarly, there are a variety of agents that may produce a chronic hepatitis. This disease is probably the unrecognized explanation for many vague gastrointestinal complaints[15] and for certain cases of chronic fatigue.

Prior to the war the clinical picture of hepatic disease except in its severer forms was vague and incomplete. The symptomatology of the nonicteric forms of hepatitis was almost unknown and seldom recognized. This situation, fortunately, has changed.[2a, b] We have developed a relatively clear idea of the clinical picture produced by at least one type of infection of the liver. As described in this paper, the diagnosis of infectious hepatitis can usually be made with reasonable certainty. The application of this knowledge to the diagnosis of other forms of hepatitis should lead to a more frequent recognition of the importance of the liver in disease and as a result to more effective treatment.

SUMMARY

The most valuable diagnostic methods and diagnostic criteria, in our experience, have been described for infectious hepatitis in its various stages. Persistent evidence of hepatic abnormality in the presence of symptoms consistent with the disease is the basis of diagnosis. In regard to laboratory methods, there is much variation in the value of tests in relation to the stage of the disease. The relative value of different procedures is indicated.

TABLE 4.—*Diagnostic Value of Various Liver Function Tests in Different Stages of Infectious Hepatitis*

	Prodromal	Acute Icteric	Acute Nonicteric	Chronic
1. Bilirubinuria	++	+	++	+
2. Bilirubinemia	++	++	++	++
3. Flocculation tests	++	+	++	+
4. Sulfobromophthalein sodium	+	0	++	++
5. Urobilinogen	+	+	++	++
6. Phosphatase	+	+	++	+
7. Prothrombin	0	+	0	0
8. Cholesterol esters	+	+	++	++
9. Albumin-globulin ratio	+	+	++	+

Key: ++, most valuable; +, limited value; 0, not of value.

13. Capps, R. B.: The Effect of Exercise and of Rest on the Course of the Disease and on the Liver in Infectious Hepatitis, to be published. Barker, Capps and Allen.[2a,b]

14. Capps, R. B.: The Methylene Blue Test for Bilirubinuria: Data Regarding Its Value, to be published. Neefe, Stokes, Rheinhold and Lukens.[11a]

15. Barker, M. H., and Capps, R. B.: Gastrointestinal Manifestations of Acute and Chronic Infectious Hepatitis, Rev. Gastroenterol. 14: 9, 1947.

THERAPEUTIC AGENTS IN LIVER DISEASE

A Review of Medicinal Agents

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The functions of the normal and diseased liver are surprisingly little affected by the action of drugs which are not hepatotoxic. In fact, in regard to the activity of drugs the striking action is that of the liver on them and not of the drugs on the liver, and one might well entitle this paper "The Effect of the Liver on Drugs" rather than "The Effect of Drugs on the Liver." Clark [1] has well summarized the situation by stating that "few means are known by which the functions of the liver can be stimulated or aided by means of drugs."

In the index of "A Manual of Pharmacology" Sollmann [2] has listed under the title, "Liver," only three subjects, namely "antianemic preparations," "extract-saline" and "liver of sulfur." A brief review of the subject indicates clearly that, with the exception of certain specific drugs used in the treatment of diseases such as amebiasis which affect the liver, there are no drugs which are specifics in the treatment of disease of the liver. In fact, the essence of the principles of treatment of hepatic disease is to dilute and eliminate toxic agents if they are known and to restore the nutritional state of the liver by supplying to it by whatever means possible and in adequate quantities all essential nutritive materials. It has been clearly and repeatedly demonstrated that the reaction of the liver to toxic agents varies with the previous diet of the subject and with the chemical composition of the liver. Therefore, principal consideration will be given in this review to recent studies of the relationships of various amino acids, vitamins, proteins and enzymes to diseases of this organ, which has been so aptly termed the "servant of the body."

NUTRITIONAL SUBSTANCES AS MEDICAL AGENTS

Fatty Liver—Relation of Lipotropic Factors—Methionine, Choline, Lipocaic and Inositol.—Grossman and Ivy [3] have pointed out that deposition of fat in the liver may result from an increase in the rate at which fat is supplied to the liver or by a decrease in the rate at which the liver is able to dispose of fat. Substances such as choline, inositol and lipocaic, which prevent some of these types of fatty livers, are known as lipotropic factors. In the transport of fat from the liver phospholipids are necessary. Of these substances lecithin, in which choline is the nitrogenous base, appears to be the principal phospholipid concerned. Choline may be supplied in the diet as choline or as phospholipid, or the body may synthesize it if sufficient compounds containing labile methyl groups are available. Methionine, a sulfur-containing amino acid, can supply this labile methyl factor and is therefore an extremely important substance.

These facts explain why fatty livers of choline deficient animals can be cured by adding choline or methionine to the diet or increasing the casein percentage in it and further explain why choline, lecithin, methionine and similar substances have been used in the treatment of hepatic disease.

In some cases of fatty liver, such as those resulting from certain poisons (toxipathic hepatitis) lipotropic substances are only partially effective in overcoming the fatty changes because factors independent of the choline supply tend to glut the liver with fat or to handicap it in the disposal of fat.

Methionine: Reports in the literature [4] indicate clearly that this amino acid is of great usefulness in the prevention and treatment of various forms of hepatic disease and particularly that of fatty liver in the experimental animal. However, reports of the use of it in hepatic disease in man are less striking and with a few exceptions not encouraging. Fagin and his associates [5] studied by chemical analysis the liver of patients with cirrhosis and came to the conclusion that the administration of amino acids to patients with alcoholic cirrhosis results in a decrease in hepatic fat and an increase in the percentage of protein; these effects are due to the methionine content of the amino acids. In the treatment of a case of accidental poisoning with carbon tetrachloride (30 to 40 cc.), Beattie and his group [6] promptly administered methionine, at first by mouth and subsequently intravenously, with prompt subsidence in the size and tenderness of the liver and in symptoms of impending hepatic coma. Subsequently, in 2 cases of carbon tetrachloride poisoning and in a large number of patients with trinitrotoluene hepatitis Eddy,[7] following the use of methionine, reports results which are encouraging and suggests that the amino acid is of clinical value.

Although 10 of the 30 patients with acute hepatitis due to trinitrotoluene observed by Eddy [7] had severe damage to the liver and although in previously reported cases the mortality rate had been 30 per cent, there were no deaths in this series. Methionine was used in doses of 2 Gm. four times a day, and although the evidence is circumstantial, this method of treatment is certainly worthy of further study.

Further clinical evidence that methionine may be useful in toxic forms (toxipathic hepatitis) of hepatic disease was present by Beattie and Marshall,[8] who in a preliminary report suggested that the occurrence of damage to the liver during arsenical treatment can be either prevented or minimized by the administration of methionine or by the use of casein digests rich in this amino acid.

The possible usefulness of methionine in the treatment of infectious hepatitis has naturally aroused great interest because of the widespread occurrence of this disease. To date the results are not particularly encouraging. Wilson, Pollock and Harris [9] gave methionine in 5 Gm. doses daily to alternate patients

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1. Clark, A. J.: Applied Pharmacology, ed. 7, London, J. & A. Churchill, Ltd., 1942.
2. Sollmann, T.: A Manual of Pharmacology, ed. 6, Philadelphia, W. B. Saunders Company, 1942.
3. Grossman, M. I., and Ivy, A. C.: The Prevention of Fatty Liver, comment, Gastroenterology **4**: 513-514 (June) 1945.
4. Miller, L. L., and Whipple, G. H.: Liver Injury, Liver Protection and Sulphur Metabolism: Methionine Protects Against Chloroform Injury Even When Given During Anesthesia, J. Exper. Med. **76**: 421-435 (Nov.) 1942; Methionine and Liver Necrosis, Nutrition Rev. **2**: 340-342 (Nov.) 1944; Methionine in the Treatment of Toxic Hepatitis, ibid. **4**: 27-28 (Jan.) 1946.
5. Fagin, I. D.; Sahyun, M., and Pagel, R. W.: Cirrhosis of the Liver: The Lipotropic Action of Parenterally Administered Amino Acid, J. Lab. & Clin. Med. **28**: 987-993 (May) 1943.
6. Beattie, J.; Herbert, P. H.; Wechtel, C., and Steele, C. W.: Studies on Hepatic Dysfunction: I. Carbon Tetrachloride Poisoning Treated with Casein Digest and Methionine, Brit. M. J. **1**: 209-211 (Feb. 12) 1944.
7. Eddy, J. H.: Carbon Tetrachloride Poisoning: A Preliminary Report on the Use of Methionine in Hepatitis, J. A. M. A. **128**: 994-996 (Aug. 4) 1945; Am. J. M. Sc. **210**: 374-380 (Sept.) 1945.
8. Beattie, J., and Marshall, J.: Methionine in Treatment of Liver Damage, Nature, London **153**: 525-526 (April 29) 1944.
9. Wilson, C.; Pollock, M. R., and Harris, A. D.: Therapeutic Trial of Methionine in Infective Hepatitis, Brit. M. J. **1**: 399-401 (March 24) 1945.

in a group of 100 men with the disease. Clinical and laboratory studies revealed no significant therapeutic effect of methionine. Subsequently Hoagland and Shank [10] in a careful study of 200 patients with the disease gave to 16 of them 5 Gm. of a racemic mixture of methionine in 200 cc. of isotonic solution intravenously on admission and daily for ten days. There were no adverse effects and no clinical or laboratory evidence that the disease was perceptibly influenced by this form of treatment.

Choline: For reasons already mentioned it is apparent that choline might be of therapeutic value in hepatic disease. Because of the great variability in the clinical course of such disease and particularly of cirrhosis, convincing evidence of the therapeutic value of substances such as choline is difficult to obtain, and at present the results of such treatment are largely confined to impressions. For example, Russakoff and Blumberg [11] placed patients with cirrhosis on a low fat Patek dietary regimen supplemented with 1.5 to 6.0 Gm. of choline chloride daily. Since no untoward effects of postprandial oral administration of the substance was noted, and since 7 of 9 patients who were treated adequately improved, the observers were of the opinion that the results were highly suggestive of a beneficial effect. Barker [12] also has advocated the use of choline chloride in cirrhosis in daily doses of 1.5 Gm. administered in the form of a 10 per cent elixir.

In their excellent study previously mentioned Hoagland and Shank [10] gave to 25 of their patients with infectious hepatitis 5 mg. of choline hydrochloride in divided doses on admission and daily thereafter for ten days. No effect which could be attributed to choline therapy was noted in the clinical course of the disease.

Reports that choline has produced hyperchromic anemia in dogs lead to the fear that similar results might occur in man. However, in one patient with cirrhosis and macrocytic anemia to whom Wilson and Castle [13] fed choline chloride in a dose of 17 mg. per kilogram of body weight daily for seventy days, the anemia was not intensified but in fact the blood improved.

Lipocaic and Inositol: Lipocaic is a lipotropic substance of pancreatic tissue effective in preventing the fatty liver which develops in depancreatized dogs maintained with insulin. Inositol, a component of the vitamin B complex, is also an essential component of the phospholipid, lipositol.

Both of these substances would appear to warrant clinical trial in those forms of hepatic disease in which deposition of fat is a significant factor, but to date reports of their use singly in the treatment of hepatic disease in man have not appeared.

Protein: The potential therapeutic value in hepatic disease of certain amino acids such as methionine has already been discussed. Brief mention should be made of the use of protein substances in this connection. Until recent years an adequate intake of protein in the treatment of hepatic disease was not stressed, since most efforts were to flood the tissues with carbohydrate, particularly dextrose, because of the remarkable effect of this substance in the prevention and control of hepatic damage in the experimental animal. Further impetus was given to this form of therapy by the development of hydrolysates of protein which permitted the administration intravenously of all of the essential amino acids in large amounts (i. e., "amigen," Mead Johnson & Company; "parenamine," Frederick Stearns & Company).

Ravdin [14] has pointed out that the essential elements of the optimum diet for the treatment of disease of the liver are high caloric content (approximately 3,000 calories), a minimum of 14 per cent and as much as 30 per cent of protein, 70 per cent of carbohydrate and a minimum of fat. He has further emphasized that an unbalanced high carbohydrate diet may lead to a high lipid as well as glycogen concentration in the liver and that such a liver would be as vulnerable to hepatic injury as if its glycogen content was low.

Most diets now prescribed by medical authorities for the treatment of hepatic disease and insufficiency contain 150 to 250 Gm. of protein daily, and it is recommended by them that as much of this amount of protein be administered orally as possible and the balance be administered intravenously.

Watson [15] has made the suggestion that pasteurized beef serum is a possible source of protein in the treatment of hepatic disease. He states that the substance is sold at ridiculously low prices as tankage for hogs; that mixed with tomato juice it is very palatable, and that beef serum albumin is undoubtedly an excellent protein from the point of view of nutrition in general and as far as the provision of methionine and the protection of the liver are concerned.

Extensive studies, particularly by Whipple and his associates,[16] on plasma protein regeneration in experimental animals have revealed facts worthy of clinical consideration. They showed among other things that when the nitrogen of the diet was provided by certain mixtures of the ten amino acids essential for growth in the rat plus aminoacetic acid, given intravenously at a rapid rate, plasma production in the dog was good. When the same mixture was given subcutaneously at a slower rate it seemed to be somewhat better utilized. However, oral feedings of the same amino acids were definitely better utilized and were associated with a lower urinary nitrogen excretion than were the same amino acids given parenterally. Furthermore, after a period of dietary deficiency, when a missing "essential" amino acid was returned to the mixture or when a complete protein was fed, some delay in the output of new plasma protein was observed. There sometimes was a lag of two or three weeks before the output became normal.

In other interesting studies of protein metabolism and the liver, Whipple and his group [17] have developed the concept of "dynamic equilibrium" of the proteins. This concept visualized a ready flow of plasma proteins out of the circulation into the tissues and vice versa.

10. Hoagland, C. L., and Shank, R. E.: Infectious Hepatitis: A Review of Two Hundred Cases, J. A. M. A. **130:** 615-621 (March 9) 1946.
11. Russakoff, A. H., and Blumberg, H.: Choline as Adjuvant to Dietary Therapy in Cirrhosis of the Liver, Ann. Int. Med. **21:** 848-862 (Nov.) 1944.
12. Barker, W. H.: The Modern Treatment of Cirrhosis of the Liver, M. Clin. North America **29:** 273-293 (March) 1945.
13. Wilson, J., and Castle, W. B.: Failure of Choline Chloride to Augment Anemia in Cirrhosis of the Liver, J. A. M. A. **129:** 802-803 (Nov. 17) 1945.
14. Ravdin, I. S.: Some Recent Advances in Surgical Therapeusis, Ann. Surg. **109:** 321-333 (March) 1939.
15. Watson, C. J.: Cirrhosis of the Liver: Clinical Aspects with Particular Reference to Liver Function Tests, Am. J. Clin. Path. **14:** 129-137 (March) 1944.
16. Madden, S. C.; Anderson, F. W.; Donovan, J. C., and Whipple, G. H.: Plasma Protein Production Influenced by Amino Acid Mixtures and Lack of Essential Amino Acids: Deficiency State Related to Unknown Factors, J. Exper. Med. **82:** 77 (Aug.) 1945.
17. Fink, R. M., and others: Plasma Protein, Metabolism Normal, and Associated Shock: Observations Using Protein Labeled by Heavy Nitrogen in Lysine, J. Exper. Med. **80:** 455-475 (Dec.) 1944.

As has been stated,[18] "it is their belief that the liver is concerned with the production of many of the plasma proteins and with the maintenance of the normal levels of these proteins in the circulating blood. The liver in other words is the 'master organ' for various protein metabolic activities. It stores protein, it makes protein (fibrinogen, prothrombin, and other globulins and albumins) and it aggregates amino acids and other nitrogenous materials coming from the gastrointestinal tract into protein." It is, moreover, indicated that the liver is concerned directly or indirectly with the production of new hemoglobin.

Further data to support the thesis of "dynamic equilibrium" of tissue and plasma proteins is presented by Fink and his associates,[17] who suggest that there is in the normal animal an active tissue mass of protein about equal in size to the mass of plasma protein, since the rapid dilution phase (of administered amino acids containing lysine tagged with heavy nitrogen in the epsilon amino position) seemed to end near the 50 per cent level.

Further evidence of the close relation of hepatic function and protein intake is indicated by the studies of Goettsch, Lyttle, Grim and Dunbar,[19] which indicate that animals placed on a diet extremely low in protein and experiencing hypoproteinemia as a result seemed to show impairment in hepatic function that paralleled the decline in serum albumin. In a study indicating anatomic changes in the liver following protein starvation, Elman and his group[20] have demonstrated that the histologic appearance of the liver as well as its content of nitrogen and glycogen depend on the intake of carbohydrate and that, while a protein deficient diet will lead to a protein deficient liver, carbohydrate intake exerts a great influence on the histologic appearance. When the carbohydrate intake is high the cells are large, contain little protein and present a rarefied appearance of the cellular protoplasm often called hydropic degeneration. After a fast (absence of carbohydrate), the liver is just as deficient in total nitrogen because it is smaller, and the microscopic picture may be called one of atrophy; the cells are smaller, the nuclei closer together and the cytoplasm dense.

Brief mention should also be made of the protein catabolic process which accompanies trauma—particularly that of fractures, burns and certain types of infections, including meningitis and virus pneumonia—and in which disease of the liver may play a prominent role. It has been pointed out[21] that the vigor of protein catabolism appears to depend on the two factors of intensity of stimulus and the capacity of the organism to respond to the stimulus.

The high loss of protein associated with this catabolic process appears not to be appreciably spared during its height by large quantities of protein, whether they are administered orally or intravenously as amino acids. The extent of this catabolic process is indicated by the studies of Cuthbertson[22] in 6 patients in whom an average loss of bodily nitrogen following fractures was more than 220 Gm. Expressed in terms of protein this would be about 1,400 Gm. or in terms of normal muscle protoplasm 15 pounds (6.8 Kg.). The period of protein loss continued for an average of 35.6 days.

All these studies among others indicate definite and probable relationship between the liver and protein metabolism in the normal person and of hypoproteinemia and altered metabolism in patients with disease of the liver. It seems clear that an adequate and probably high intake of complete proteins is desirable in the treatment of hepatic disease, that the substances are probably better utilized when administered by the natural oral channel and that during the interval when sufficient amounts cannot be so administered the intravenous administration of amino acid preparations is advantageous.

Carbohydrate: The usefulness of large amounts of carbohydrate as a therapeutic measure in disease of the liver is so well established and so universally recognized that no further discussion of it is needed in this review.

Vitamin A: The metabolism of vitamin A and its precursor, carotene, and of the liver are intimately related. In hepatic disease the plasma values for vitamin A are usually lower than normal and the amount stored in the liver less than the normal. These changes come about as a result of a less than normal dietary intake of the vitamin, inadequate absorption of it and/or interference with normal hepatic cell function. It seems unlikely that administration of the vitamin would benefit patients with hepatic disease. In an effort to study this problem Abels and his collaborators[23] gave to 8 patients with carcinoma of the gastrointestinal tract and with impaired hepatic function 50,000 to 150,000 U. S. P. units of vitamin A daily for seven to twenty days. The plasma level of vitamin A was raised in 2 instances only, although the administration of vitamin A was made parenterally in 7 of the 8 cases. To date it seems likely that the only clinical value of the study of vitamin A metabolism in hepatic disease is as a diagnostic test.

Ascorbic Acid: Clinical evidence is lacking that the metabolism of ascorbic acid is significantly altered or that the vitamin is of therapeutic value in hepatic disease. Some experimental data exist, however, to indicate that ascorbic acid may exhibit a protective action. In guinea pigs, at least, Beyer[24] convincingly demonstrated that ascorbic acid protected the liver from the hepatotoxic effect of hydrazine to a significant degree.

MEDICINAL AGENTS WHICH PRODUCE TOXIC EFFECTS ON THE LIVER

One of the most striking and clinically significant functions of the liver has to do with its detoxifying function. In this respect the liver seems to be the chief organ of defense of the body. In the process of detoxifying certain substances and thus preserving the organs as a whole, the liver may suffer variable amounts of damage. Brief mention should be made in this review of the effect of certain therapeutic agents which may at times be hepatotoxic.

As was pointed out by Clark,[1] toxic agents may be handled by the liver in various ways—they may be excreted unchanged in the bile, broken down by the

18. The Role of the Liver in Producing Hemoglobin and Plasma Protein, Nutrition Rev. **3**: 197-198 (July) 1945.
19. Goettsch, E.; Lyttle, J. D.; Grim, W. M., and Dunbar, P.: Amino Acid Studies: I. Plasma Amino Acid Retention in the Hypoproteinemic Dog as Evidence of Impaired Liver Function, J. Biol. Chem. **144**: 121-134 (June) 1942.
20. Elman, R.; Smith, M. G., and Sachar, L. A.: Correlation of Cytological with Chemical Changes in the Liver as Influenced by Diet, Particularly Protein, Gastroenterology **1**: 24-33 (Jan.) 1943.
21. Protein Metabolism During Convalescence After Trauma, Nutrition Rev. **3**: 253-254 (Aug.) 1945.
22. Cuthbertson, D. P.: Post-Shock Metabolic Response (Arris & Gale Lecture), Lancet **1**: 433-436 (April 11) 1942.
23. Abels, J. C.; Rekers, P. E.; Binkley, G. E.; Pack, G., and Rhoads, C. P.: Metabolic Studies in Patients with Cancer of Gastrointestinal Tract: Hepatic Dysfunction, Ann. Int. Med. **16**: 221-240 (Feb.) 1942.
24. Beyer, K. H.: Protective Action of Vitamin C Against Experimental Hepatic Damage, Arch. Int. Med. **71**: 315-324 (March) 1943.

liver, synthesized or conjugated to form innocuous compounds or stored. Indeed, the duration of action of many drugs, including barbiturate and sulfonamide compounds, is limited by the detoxification of them in the liver. The conversion of ammonium salts into urea is the most important detoxifying action of the liver.

Chester Jones [25] has listed some of the hepatotoxic agents which are frequently used therapeutically or which are commonly used industrially and to which, therefore, the livers of many persons may become exposed. Among the former may be listed arsenicals, gold, bismuth, cinchophen and sulfonamide compounds; and among the latter carbon tetrachloride, trinitrotoluene, tetrachlorethylene and phosphorus. Anesthetic agents such as chloroform, tribromoethanol and ether also are hepatotoxic, as is alcohol.

Brief mention should be made of the effect of some of those hepatotoxic agents. In general the significant factors in this process, in addition to the dose of the toxic substance administered, are the sensitivity of the person or his liver to the drug and the nutritive state of the patient. As Jones [25] has pointed out, the caloric adequacy in the diet, the inclusion of various substances, such as proteins, specific amino acids and vitamins, particularly those of the vitamin B complex, and the exclusion of excessive amounts of fat are factors that undoubtedly modify the response of the liver to noxious substances.

Arsenic.—There is much controversy concerning the relation of arsenotherapy for syphilis and hepatic damage. Of interest among reports related to this subject are the following: Riddell and Anderson [26] were of the opinion that in the case of neoarsphenamine and oxophenarsine hydrochloride, at least, the effect was dependent primarily on individual sensitivity rather than on the quantity of the drug administered. In a study of jaundice in the Canadian Army, Mitchell [27] observed that the incidence of clinical jaundice in those patients receiving arsenotherapy for syphilis was over thirty-six times as high as that in the group of syphilitic patients not receiving arsenical therapy. Incidentally, jaundice occurred three times as commonly in patients treated with neoarsphenamine as in those treated with oxophenarsine hydrochloride. The possibility was raised that preexisting unrecognized infectious hepatitis without jaundice may have been a factor in producing the high incidence of jaundice following arsenotherapy.

Annegers and his colleagues [28] suggested that the oral administration of dehydrocholic acid may aid in counteracting the hepatotoxic action of oxophenarsine hydrochloride.

Sulfonamide Drugs.—The relation of sulfonamide therapy to hepatic disease is still not clear but is worthy of consideration because of the wide use of these drugs. Sulfonamide therapy may occasionally result in direct damage to the liver, as indicated by the studies of Menten and Andersch,[29] who observed toxic necrosis and toxic central necrosis of the liver in children with liver disease who had had sulfonamide therapy. However, not all the evidence is unfavorable, for there is considerable experimental data to show that sulfonamide compounds are not only not harmful but may actually be helpful in preventing damage to the liver. Machella and Higgins [30] studied rats to which carbon tetrachloride had been given and concluded that administration of sulfanilamide to rats with hepatitis did not increase the damage to the liver. In fact, it appeared to lessen the damage. Furthermore, sulfanilamide did not impede regeneration of the liver after the dosage of carbon tetrachloride was discontinued, nor did it produce any detectable injury to the livers of animals with obstructive jaundice. Further studies by Forbes and Evans [31] indicated that sulfanilamide apparently exerted a protective action against damage to the liver from the inhalation of chloroform in rats and rabbits. Clinical observations which bear out these experimental observations have been made by Peterson, Deutsch and Finland,[32] who reported that in patients with acute hepatitis and bacterial infection, sulfonamide therapy was almost always accompanied with improvement in hepatic function paralleling the improvement in the underlying infection. Furthermore, some severe toxic effects other than those of direct injury to the liver were unusually frequent in patients with portal cirrhosis and intercurrent infections. Caution should be exercised in the administration of sulfonamide compounds in patients with severe portal cirrhosis of the liver. Sulfadiazine produced fewer reactions than did sulfathiazole.

Cinchophen.—Annegers and his associates [33] have presented evidence that the administration of cinchophen to a susceptible animal may produce decided temporary depression of the synthesis and secretion of cholic acid and, further, that despite recovery of this function death could occur. This observation indicated that some other unrelated vital function of the liver had been impaired by the drug.

Quinine and Quinacrine Hydrochloride.—Anderson and his associates [34] have indicated that in the experimental animal there is in the liver some agent that is evidently active in the metabolic destruction of quinine, and that underlying hepatic disease may seriously alter the therapeutic effects of the drug.

The effects of quinacrine hydrochloride ("atabrine *di*-hydrochloride") in the liver are indefinite. Annegers and his associates [35] indicated that in some human beings damage to the liver seems to occur, but to date the available information is not striking. However, in another study of the toxic effects of this drug Butt and his associates [36] indicated that at high dosage levels it

25. Jones, C. M.: Liver Intoxication, New England J. Med. **230:** 766-774 (June 22) 1944.

26. Riddell, R. W., and Anderson, T. F.: Hippuric Acid Liver-Function Test During Treatment with Arsenicals, Lancet **1:** 275-276 (Feb. 26) 1944.

27. Mitchell, H. S.: Incidence of Catarrhal Jaundice Compared with Jaundice Following Arsenotherapy for Syphilis, Canad. M. A. J. **48:** 94-96 (Feb.) 1943.

28. Annegers, J. H.; Drill, V. A.; Habegger, J.; Ivy, A. C., and Atkinson, A. J.: Hepatotoxic Action of Arsenicals: Effect of Neoarsphenamine and Mapharsen on Cholic Acid Synthesis and Use of Hydrocholic Acid to Diminish Hepatotoxic Action of Mapharsen, Arch. Dermat. & Syph. **51:** 112-115 (Feb.) 1945.

29. Menten, M. L., and Andersch, M. A.: Hepatic Damage Associated with Sulfonamide Therapy in Infants and Children: I. Morphologic Pathology; II. Changes in Liver Function Test During Sulfonamide Therapy, Ann. Int. Med. **19:** 609-628 (Oct.) 1943.

30. Machella, T. E., and Higgins, G. M.: The Effect of Sulfanilamide on the Experimentally Damaged Liver, Am. J. M. Sc. **204:** 194-201 (Aug.) 1942.

31. Forbes, J. C., and Evans, E. J.: Protective Action of Sulfanilamide Against Hepatic Damage from Chloroform Inhalation, War Med. **4:** 418-421 (Oct.) 1943.

32. Peterson, O. L.; Deutsch, E., and Finland, M.: Therapy with Sulfonamide Compounds for Patients with Damage to the Liver, Arch. Int. Med. **72:** 594-612 (Nov.) 1943.

33. Annegers, J. H.; Snapp, F. E.; Ivy, A. C., and Atkinson, A. J.: Effect of Cinchophen on Secretion of Cholic Acid, Arch. Int. Med. **73:** 1-6 (Jan.) 1944.

34. Anderson, C. E.; Cornatzer, W. E., and Andrews, J. C.: Role of Liver in Metabolic Destruction of Quinine, J. Pharmacol. & Exper. Therap. **79:** 62-69 (Sept.) 1943.

35. Annegers, J. H.: Retention of Atabrine in Animal Body, Excretion in Bile and Urine and Effect on Cholic Acid Output, War Med. **4:** 176-186 (Aug.) 1943.

36. Butt, H. R.; Hall, J. E.; Watkins, C. H., and Cragg, R. W.: Atabrine Dihydrochloride (Quinacrine Hydrochloride): Some Observations on Its Toxicity and on Its Use in the Treatment of Malaria, with Particular Reference to Its Effect on the Liver, Gastroenterology **4:** 205-212 (March) 1945.

does not have any particularly significant hepatotoxic action in man.

Thiouracil.—Experimental evidence has been presented by György and Goldblatt [37] to indicate that the addition of thiouracil to a cirrhosis-producing synthetic diet has a preventive effect on the development of cirrhosis in rats. It is suggested that the protective action of thiouracil and perhaps also of sulfonamide compounds on the liver is indirectly achieved through their effect on the thyroid which lowers the rate of metabolism of methionine.

EFFECTS OF BILE SALTS

In association with a summary of the effects of drugs on the liver brief mention should be made of the recent studies of the effect of certain drugs on the flow of bile. In an editorial comment on the matter of cholecystogogues, choleretics and cholepoietics, Ivy [38] advocated the adoption of cholecystogogue as a term referring to an agent or agency which causes or promotes the evacuation of the gallbladder. Choleresis he considered a general term meaning an increase in the output of bile, while cholepoiesis in his opinion is a general term referring specifically to the process of formation of bile by the liver. Various modifications of these terms may be used to indicate the specific effect of any substance. The administration of a mixture of sodium taurocholate and glycocholate (extract of ox bile U. S. P., or natural bile salts) causes a choleresis, cholaneresis and cholesteroleresis. Of particular interest to physicians will be the observations of Ivy and his associates [39] that aloe and podophyllum resin in the form of "Carter's little liver pills" have no detectable effect on the formation of bile by the liver, the evacuation of the gallbladder and the passage of bile into the duodenum.

HORMONES AND THE LIVER

Inactivation of Hormones.—The normal liver plays a significant role in inactivating certain hormones. The close relation of the inactivational functions of the liver and the nutritional status of it is indicated by the following observation. The normal liver plays an important role in inactivating estradiol, while the livers of animals deficient in thiamine or riboflavin failed to inactivate the substance. However, livers of animals depleted of pyridoxine, pantothenic acid, biotin or vitamin A retained their ability to inactivate the substance.[40]

The liver is said to play a significant role in the inactivation of corpus luteum hormone, serum gonadotropin, epinephrine and diethylstilbestrol.

Thyroxin and Desiccated Thyroid.—The relation between hyperthyroidism and the hormones of the thyroid gland and the liver are not entirely clear. There is little question of the occurrence of hepatic disease in some cases of hyperthyroidism. The changes in the liver may be classified as acute degenerative lesions, atrophy (generalized or focal) and cirrhosis. Increasing evidence is accumulating to indicate that factors other than the thyroid hormone enter into the hepatic changes. Recently Drill and Gunn [41] have shown that rats fed sufficient amounts of thyroid to produce pronounced loss of weight over a period of seventeen to eighteen days did not show any significant changes in the liver when compared to normal animals on the same diet. Similarly those rats fed the gland for eighty-one days and receiving a supplement of yeast concentrate revealed normal histologic structure of the liver. Drill and Gunn suggested that previous reports of hepatic damage experimentally produced by feeding thyroid were at least in part due to the type of diet fed (i. e., one low in vitamin B content). On the other hand, McIver and Winter [42] performed experiments which indicated that anoxemia is significant in the production of varying degrees of hepatic injury in animals made hyperthyroidic with thyroxin. Control rats given thyroxin without being subjected to anoxemia showed only low hepatic glycogen and no structural lesions in the liver.

Epinephrine.—Injections of epinephrine produce curves of blood sugar which are lower in patients with disease of the liver than in normal persons. Recent studies by Bradley [43] have indicated that the substances may also have an effect on hepatic blood flow. This worker, who developed a technic for estimating hepatic blood flow in man, found that in 6 of 7 cases the estimated hepatic blood flow increased, occasionally as much as 300 per cent following the intramuscular administration of 0.4 to 1.0 cc. of epinephrine.

EFFECT OF MISCELLANEOUS AGENTS

Gamma Globulin.—In January 1945 Stokes and Neefe [44] presented definite evidence that gamma globulin is capable of preventing or attenuating infectious hepatitis when administered to exposed persons during the incubation period of the disease. The possibility was indicated also that the substance might be of therapeutic value if given early in the preicteric stage of hepatitis. This effect was subsequently verified in another study by Stokes and his associates [45] and by Paul and Havens.[46] In adults a dose of 10 cc. of gamma globulin and in children a dose of 0.08 cc. of gamma globulin per pound (0.5 Kg.) of body weight given intramuscularly proved effective.

Liver Extract.—It seems natural that extracts of liver in various forms should have been used in the treatment of disease of this organ, although the rationale for the use of them may be a little obscure.

It appears evident that the effect of liver extract in hepatic disease is not specific. The frequent occurrence of macrocytic anemia in chronic hepatic disease has been used as an argument in favor of use of liver extract in these diseases, and more recently it has been stated (Hoagland and Rivers [47]) that in some cases of infectious hepatitis the use of crude liver extract has

37. György, P., and Goldblatt, H.: Thiouracil in the Prevention of Experimental Dietary Cirrhosis of the Liver, Science **102:** 451-452 (Nov. 2) 1945.

38. Ivy, A. C.: Cholecystogogues, Choleretics, and Cholepoietics, editorial, Gastroenterology **3:** 54-57 (July) 1944.

39. Ivy, A. C.; Roth, J. A., and Gutmann, N. S.: Do Aloes & Podophyllum (Carter's Little Liver Pills) Increase the Flow of Bile into the Duodenum? Gastroenterology **5:** 27-33 (July) 1945.

40. Diet and Inactivation of Estradiol by the Liver, Nutrition Rev. **3:** 27-29 (Jan.) 1945.

41. Drill, V. A., and Gunn, F. D.: Hepatic Lesions and Experimental Hyperthyroidism, Endocrinology **35:** 477-482 (Dec.) 1944.

42. McIver, M. A., and Winter, E. A.: Deleterious Effects of Anoxia on Liver of Hyperthyroid Animal, Arch. Surg. **46:** 171-185 (Feb.) 1943.

43. Bradley, S. F.: Studies of Hepatic Blood Flow in Man, read at the meeting of the American Society for Clinical Investigation, May 27, 1946.

44. Stokes, J., Jr., and Neefe, J. R.: The Prevention and Attenuation of Infectious Hepatitis by Gamma Globulin, J. A. M. A. **127:** 144-145 (Jan. 20) 1945.

45. Gellis, S. S.; Stokes, J., Jr.; Brother, G. M.; Hall, W. M.; Gilmore, H. R.; Beyer, E., and Morrissey, R. A.: Use of Human Immune Serum Globulin (Gamma Globulin) in Infectious Hepatitis in Mediterranean Theater of Operation: Studies on Treatment in Epidemic of Infectious Hepatitis, J. A. M. A. **128:** 1062-1063 (Aug. 11) 1945.

46. Havens, W. P., Jr., and Paul, J. R.: Prevention of Infectious Hepatitis with Gamma Globulin, J. A. M. A. **129:** 270-272 (Sept. 22) 1945.

47. Rivers, T. M., and Hoagland, C. L.: Therapy in Infectious Hepatitis, Tr. A. Am. Physicians, to be published.

strikingly improved the appetite of patients and has doubled their caloric intake in several weeks.

In general the results of such treatment have been obscure also. However, in recent years some promising results have been obtained in the treatment of cirrhosis of the liver by means of crude liver extract administered intravenously in large amounts (Hoagland [48]). Fleming and Snell [49] have also reported cases of cirrhosis treated with crude liver extract along with usual methods with results suggesting a good effect. To a group of 34 patients with infectious hepatitis Hoagland and Shank [10] administered daily for ten days a specially prepared aqueous extract of Cohn's fraction G of liver in amounts of 10 cc. diluted to 50 cc. with isotonic solution of sodium chloride. No adverse effects were noted and no significant alteration was observed in the average gain in weight or period of hospitalization.

Agents Used in the Treatment of Pruritus.—Medicinal measures for the relief of the pruritus of jaundice, including ergotamine tartrate, calcium salts, calomel, histamine, insulin and sodium thiosulfate, are well known, and no further comment on them is warranted here. However, it should be pointed out that in occasional instances when the use of these measures, and particularly that of ergotamine tartrate, fails or is contraindicated intravenous injections of procaine hydrochloride may give striking relief. In doses of 20 cc. of a 0.1 per cent solution (1 Gm.) in 1,000 cc. of isotonic solution of sodium chloride given intravenously slowly, Lundy [50] has found that the substance sometimes affords dramatic temporary relief for several hours (two to four or more).

Agents Used in the Control of Ascites and Edema.—Diuretics such as mersalyl, mercurophylline injection, potassium nitrate and ammonium chloride are often useful adjuncts in the control of ascites and anasarca occurring in hepatic disease, but as far as is known, in the doses used for these purposes they have no significant action on the liver.

Colloidal Thorium Dioxide.—Yater and Coe [51] in a summary of 274 cases in which colloidal thorium dioxide ("thorotrast") was used as a diagnostic measure concluded (1) that hepatosplenography was of value in the study of cirrhosis, metastases and abscess of the liver; (2) that there had been observed no evidence of latent radioactivity, depression of spleen or blood-making function, increased susceptibility to infection or development of cancer at the site of infection, and (3) that hepatosplenography was of little value in the study of splenomegaly. In cirrhosis the diagnostic criteria set up consisted of a diffuse mottling or reduced density of the liver; in metastases, rounded areas of lessened density often surrounded by a halo of increased density, and in abscess, a rounded area of reduced density, usually without a halo.

Histamine.—In further studies of estimated hepatic blood flow Bradley [43] found that histamine in doses of 0.36 to 0.60 mg. given intramuscularly caused little change in 4 instances; a transient effect similar to that caused by ephinephrine was twice observed.

Gelatin.—Considerable thought has been given to the use of gelatin as a substitute for plasma protein in the treatment of burns, shock and hepatic disease. The rapid development during the war of dried plasma, the preparation of serum albumin in a form suitable for intravenous use and the easy availability of pooled wet plasma have rendered almost needless such substitutes for plasma as gelatin and acacia.

With reference to gelatin it might be pointed out that in dogs Whipple and his associates [52] have observed that gelatin administered by vein for one to two weeks in doses of 3 to 17 Gm. per kilogram of body weight usually caused serious disturbances, including inhibition of protein production in the blood, signs of intoxication, much loss of weight and even death. For the first few days after its administration the adverse effects did not appear. In fact, the reaction was decidedly variable and the site of damage was not clear. Histologic changes were not noted, but it was considered that the liver might be the site of deleterious action by gelatin.

In a group of 6 patients with extensive carcinomatosis, Brunschwig and others [53] infused intravenously gelatin solution containing 14 to 27 Gm. daily for three to ten days. The injections were well tolerated, and slight increases in urea nitrogen excretion occurred in 5 of the patients. The variability in these reported results may be explained perhaps by the fact that gelatin is not a chemical entity but a highly variable product made from a number of different materials treated in a great variety of ways, and consequently it is probable that considerable variation in the utilization and toxicity of various samples may occur.

Diet and Hepatic Tumor Formation.—Another phase of evidence clearly demonstrates the importance of adequate nutrition in protecting the liver against hepatotoxic agents. The well known effect of the aniline dye butter yellow (P-dimethylaminoazo benzine) in producing hepatic tumors in rats can be effectively modified by the use of protective foods including liver, yeast, milk and mixtures of certain grains. In 1944 Opie [54] demonstrated that fat in the diet accelerates the production of hepatic lesions by this dye and that when the quantity of fat in the diet is small few tumors are produced.

SUMMARY

There are no drugs which are specific in the treatment of hepatic disease. The principal effect is that of the liver on drugs and not of drugs on the liver. Dietary substances are of greater value in the prevention than in the treatment of hepatic diseases. They are also of greater value in acute trophopathic hepatitis than in chronic toxipathic hepatitis, in which their value appears limited.

Until specific drugs are available, the principal forte in the treatment of hepatic disease will continue to be along the general lines of increasing the resistance of and the restorative powers of the liver (1) by supplying it with abundant quantities of essential nutritive materials, (2) by diluting, neutralizing or eliminating hepatoxic substances and (3) by physical rest of the affected person.

48. Hoagland, C. L.: The Therapy of Liver Diseases, Bull. New York Acad. Med. **21**: 537-556 (Oct.) 1945.
49. Fleming, R. G., and Snell, A. M.: Portal Cirrhosis with Ascites: Analysis of Two Hundred Cases with Special Reference to Prognosis and Treatment, Am. J. Digest. Dis. **9**: 115-120 (April) 1942.
50. Lundy, J. S.: Clinical Anesthesia, Philadelphia, W. B. Saunders Company, 1942.
51. Yater, W. M., and Coe, F. O.: Ten Years' Experience with Thorotrast Hepatosplenography, Ann. Int. Med. **18**: 350-366 (March) 1943.
52. Robscheit-Robbins, F. S.; Miller, L. L., and Whipple, G. H.: Gelatin: Its Usefulness and Toxicity, J. Exper. Med. **80**: 145-164 (Aug.) 1944.
53. Brunschwig, A.; Corbin, N., and Johnston, C. D.: Intravenous Gelatin, Ann. Surg. **118**: 1058-1063 (Dec.) 1943.
54. Opie, E. L.: Influence of Diet on Production of Tumors of Liver by Butter Yellow, J. Exper. Med. **80**: 219-230 (Sept.) 1944.

Clinical Notes, Suggestions and New Instruments

THE TREATMENT OF SHOCK BY AORTIC TRANSFUSION DURING THORACIC OPERATIONS

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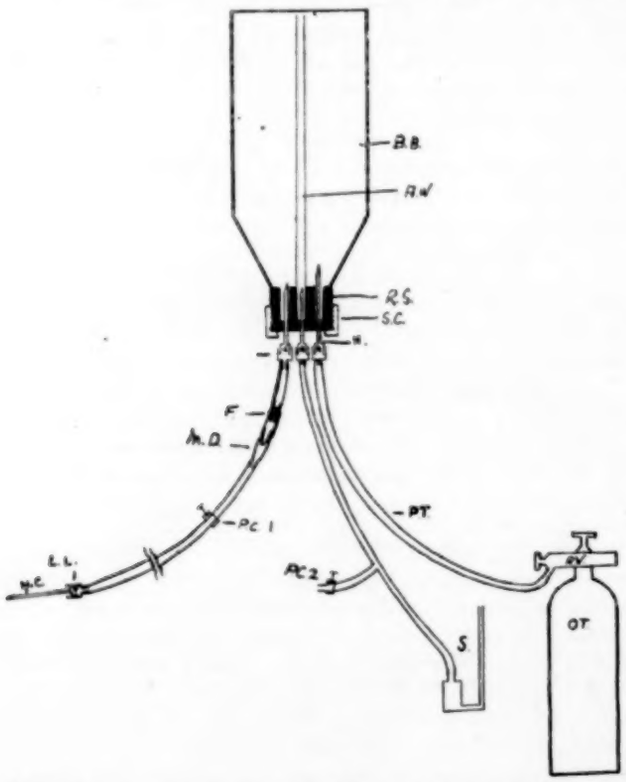
Peripheral arterial transfusions have been shown to be of value experimentally in the study of shock by Kohlstaedt and Page.[1] Gardner [2] has proved their usefulness in its clinical control. Arterial transfusions may have occasional value in thoracic surgery. Uncontrollable hemorrhage during thoracic operations is a potential hazard. If this complication should occur it may be impossible to provide sufficient blood intravenously after hemostasis to sustain life. It may be difficult or occasionally impossible to obtain veins for venipuncture if the patient is in shock. Unnecessary time may be lost in attempting venipuncture. Even though blood can be provided in adequate amounts the dangers of pulmonary edema and right sided cardiac failure are ever present when blood is given too rapidly intravenously.



Apparatus for arterial transfusion: B.B., blood bottle; A.W., airway; R.S., rubber stopper; S.C., screw cap; N., needles (size indicated); L.L., luer locks; F., filter; M.D., Murphy drip; P.T., pressure tubing; P.C. 1 and 2, pinchcocks; S., sphygmomanometer; R.V., reducing valve; O.T., oxygen tank and N.C., needle or cannula in patient's artery. With pinchcock 1 closed and pinchcock 2 open the oxygen is turned on to 1 liter per minute. This oxygenates the blood as shown by the change in color from dark red to bright red. Pinchcock 2 is slowly closed. The pressure in the blood bottle is controlled during the transfusion by adjusting pinchcock 2.

The mortality rate from injuries of the mediastinal vessels is high. Though the hemorrhage may be surgically controlled, death may result from loss of blood and shock. If the state of shock persists unduly long permanent damage may result from anoxemia of the brain, kidneys and liver. Heretofore, treatment has consisted mainly of intravenous replacement and cardiorespiratory stimulants. The aorta lends itself readily for the administration of blood as an emergency procedure during operations within the chest. Furthermore, oxygenated blood can be provided, thus reducing the factor of anoxemia. The following case report demonstrates the benefit possible from such a procedure.

REPORT OF CASE

At 3 o'clock in the morning of Nov. 16, 1946 a Negro man aged 60 was admitted to the accident room of St. Luke's Hospital. He was semiconscious, inebriated and in shock. He had received a stab wound in the first intercostal space adjacent to the sternum approximately thirty minutes prior to entry. The pulse was feeble and soon disappeared. The blood pressure was unobtainable. The right side of the chest was dull to percussion. Faint breath sounds could be heard anteriorly near the sternum. There was evidence of a mediastinal shift to the left. Fluoroscopic examination revealed the right chest to be opaque and the mediastinum shifted to the left. Plasma was given immediately without significant benefit; this was followed by a blood transfusion. Though the blood pressure and pulse were unobtainable the patient continued to have rapid gasping respirations. From the position of the stab wound it was felt that the innominate artery or the superior vena cava had been injured.

He was taken to the operating room and a thoracotomy performed. As a result of the profound shock and alcoholic consumption it was possible to introduce an intratracheal tube under light anesthesia. Controlled ventilation was maintained by the anesthetist during the operative procedure, mainly with oxygen.

The right side of the chest was entered anteriorly through the bed of the second rib. The sternum was transected to allow adequate exposure of the superior mediastinal vessels. There was no bleeding from the wall of the chest when the incision was made. It was noted that the internal mammary artery had been severed approximately 1 inch (2.5 cm.) from its origin by the injury. Blood was slowly oozing from the cut section. This artery was immediately ligated. The entire right side of the chest was filled with clotted and fluid blood, which was removed. No other source of bleeding from the mediastinal vessels or from the right lung could be found. The patient still had no pulse or blood pressure, and the heart was observed to be beating rather slowly, as in failure. As an emergency procedure an oxygenated transfusion was given into the ascending aorta through a size 18 needle. The first portion of the transfusion was given by oxygen pressure and the latter by pressure from a hand pump. Five hundred cubic centimeters of blood were given in three minutes. There was no bleeding from the aorta after the removal of the needle. Immediately following the aortic transfusion a pulse was palpable, and as the chest wall was closed the blood pressure was 80 systolic and 50 diastolic.

The postoperative course was characterized by drowsiness, diarrhea and incontinence for the first three days. It was impossible to determine the urinary output during this time. There was no urinary output on the fourth and fifth postoperative day, while the daily fluid intake was 3,000 cc.

Chemical analysis of the blood on the fourth postoperative day showed the nonprotein nitrogen to be 182 mg. per hundred cubic centimeters, the creatinine 14.1 mg. per hundred cubic centimeters and the carbon dioxide combining power 36.2 volumes per cent. The serum protein level was 6.8 Gm., the chlorides 554 mg. and the sugar 141 mg., per hundred cubic centimeters. The nonprotein nitrogen increased to 219 mg. per hundred cubic centimeters on the seventh postoperative day.

It was felt that the renal damage and failure were probably due to anoxemia of the kidneys during the period of shock. The possibilities of previous renal disease and of reaction to transfusion were also considered. Appropriate treatment was administered for the renal failure. On the sixth postoperative day the urinary output was 670 cc., and the amount increased daily thereafter. The nonprotein nitrogen and blood creatinine values gradually decreased, so that at the time of discharge on Dec. 7, 1946 the nonprotein nitrogen was 45.5 mg. and the creatinine 1.8 mg., per hundred cubic centimeters. Urinalysis six days

1. Kohlstaedt, K. G., and Page, I. H.: Hemorrhagic Hypotension and Its Intra-Arterial and Intravenous Infusion of Blood, Arch. Surg. **47**: 178 (Aug.) 1943.
2. Gardner, W. J.: The Control of Bleeding During Operation by Induced Hypotension, J. A. M. A. **132**: 572 (Nov. 9) 1946.

postoperatively showed a concentration of 1.015, a trace of albumin, and an infrequent red blood cell but no casts. Subsequent microscopic analyses of the urine revealed no abnormalities.

A check-up examination Jan. 22, 1947 showed the patient to be in good health and asymptomatic except for paresthesia in both hands. A urea clearance test at this time was 68 and 74 per cent of normal.

A diagrammatic sketch of the apparatus for providing oxygenated arterial transfusions under pressure is shown.

SUMMARY

An injury to the right internal mammary artery with an exsanguinating hemorrhage is reported. The blood pressure and pulse of the patient were unobtainable for approximately one hour. Operative hemostasis and restoration of the blood pressure by an intra-aortic transfusion of oxygenated blood was performed. The postoperative convalescence was complicated by evidence of uremia.

It is felt that intra-aortic transfusions of oxygenated blood may be lifesaving in certain emergencies arising during thoracic operations.

Council on Physical Medicine

The Council on Physical Medicine has authorized publication of the following reports. HOWARD A. CARTER, *Secretary.*

WESTERN ELECTRIC HEARING AID, MODEL #64, ACCEPTABLE

Manufacturer: Western Electric Company, 195 Broadway, New York.

This instrument is a two unit hearing aid, the microphone and amplifier in one pack and the batteries in the other. The plastic case containing the amplifier and microphone has the volume control and combination switch-tone-control set in the top of the case. Cords for batteries and receiver are connected by a plug at the bottom of the case. Three battery cases are available, one for light duty, 22.5 volt batteries, and two larger cases for heavier duty. Three tone control settings are possible and are indicated on the switch by one, two and three dots.

Western Electric Hearing Aid #64.

Dimensions and Weight

Weight.—Hearing aid alone, 4.2 ounces (119 Gm.).

Small battery case and batteries, 3.5 ounces (99 Gm.).

Medium battery case and batteries, 7.5 ounces (213 Gm.).

Large battery case and batteries, 8.1 ounces (230 Gm.).

Dimensions.—Microphone and amplifier, 4¼ by 2½ by 1 inches (8.2 by 6.4 by 2.5 cm.).

Small battery case, 2 15/16 by 2 7/16 by 5/8 inches (7.4 by 7.0 by 1.6 cm.).

Medium battery case, 3 11/16 by 2 9/16 by 1 1/16 inches (9.3 by 6.6 by 2.8 cm.).

Large battery case, 3 5/16 by 2½ by 1⅜ inches (8.4 by 6.4 by 7.0 cm.).

Battery	Measured Voltage	Measured Current
A. 1½ volts	1.5 volts	80 milliamperes
B. 22½ volts	22.5 volts	1.3 milliamperes
B. 30 volts	30 volts	2.2 milliamperes

Acoustical Gain

Acoustical gain measurements were made using the regular procedure followed in the Council's acceptance tests of other hearing aids and described in the *Journal of the Acoustical Society of America*, vol. 16, No. 1, pages 38-44. Acoustical gains measured in this way are known to be somewhat lower than the free field measurements used in obtaining the data submitted by the manufacturers. When allowance is made for the difference in the two methods, the measured values are in reasonable agreement with those submitted by the manufacturers. Typical results of the measurements of the Council are tabulated as follows:

Frequency	256	512	1,024	1,200	2,250	3,100	4,096 cycles
Full volume							
Tone control set at 1..	23	37.5	37	40	43	44	36.5 decibels
Tone control set at 3..	4	14	24	25	34	36	34 decibels

Approximate values of maximum pressure levels, at four frequencies with the instrument attached to coupler with volume of 2 cc., control set at full gain and at No. 1 tone setting, are shown as follows:

Frequency	Input Level	Maximum Output Level
600 cycles	65 decibels	95 decibels
1,024 cycles	65 decibels	97 decibels
2,048 cycles	65 decibels	95 decibels
3,100 cycles	70 decibels	103 decibels

Intelligibility tests were made and showed satisfactory performance. The Council on Physical Medicine voted to include the Western Electric Hearing Aid, Model #64, in its list of accepted devices.

TELEX HEARING AID MODEL #22 ACCEPTABLE

Manufacturer: Telex, Inc., Minneapolis.

This instrument, Model #22, is self contained. The battery compartment in the lower half of the case is covered by a snap-back. The plastic case is composed of three parts. The wearing clip is on the back of the case, opposite the microphone grill. The receiver cord plugs into the top end of the case.

The two-position tone control switch and the combination on-off and volume control switch are placed at the upper corners. One magnetic receiver, a Telex A, was supplied.

Dimensions and Weight.—Dimension 5¼ by 2⅜ by ⅞ inches (13.3 by 6.0 by 2.2 cm.). Weight 6.8 ounces (193 Gm.).

Batteries	Measured Voltage	Measured Current
A 1½ volts	1.3 volts	65 milliamperes
B 30 volts	27.5 volts	0.56 milliamperes

Acoustical Gain.—Measurements were made of the gain in decibels in the sound pressure level set up attached to a 2 cc. coupler over the pressure levels at the microphone placed in the face of a 16 by 8 inch (40.6 by 15.2 cm.) baffle. The input level at each frequency was 0.02 dyne per square centimeter. The following figures, in decibels, are typical of the results obtained when the volume-control was turned full-on at various frequencies:

Frequency.....	256	512	1,024	1,200	2,250	3,100	4,096 cycles
Tone controls							
#1 (upper).....	43.0	50.5	55.0	56.5	50.0	48.0	40.0 db.
#2 (lower).....	33.0	42.5	51.5	54.0	56.5	47.5	40.0 db.

Approximate values of maximum pressure levels, at four frequencies observed on a 2 cc. coupler with volume control set for full gain and the number 1 (upper) tone setting:

Frequency	Input Level	Maximum Output Level
600 cycles	55 decibels	102 decibels
1,024 cycles	66 decibels	104 decibels
2,048 cycles	50 decibels	103.5 decibels
2,250 cycles	50 decibels	105.5 decibels

Intelligibility tests were made with a normally hearing person so placed that the speaker could barely be heard with the hearing aid turned off. These tests indicated satisfactory performance.

The Council on Physical Medicine voted to include the Telex Hearing Aid, Model #22, in its list of accepted devices.

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SATURDAY, JUNE 14, 1947

ESSENTIAL FATTY ACIDS AND INFANTILE ECZEMA

Experimental studies have demonstrated that certain unsaturated fatty acids are essential for the maintenance of normal skin in several species of animals.[1] Whether or not this is true for man has not yet been convincingly shown. However, some indication that these substances might also play some role in human nutrition was first observed in patients with infantile eczema.[2] Certain babies afflicted with this condition appeared to be benefited when vegetable oils rich in unsaturated fatty acids are added to the diet in comparatively large amounts. Subsequent clinical studies in infants and children have both confirmed and denied the favorable effect claimed, perhaps the bulk of evidence being confirmatory, however.

Hansen and his co-workers[3] have reported further extensive studies on eczema in 225 patients, the majority of whom were under 2 years of age. The patients were first carefully examined and a comprehensive record was made of the locations, nature and severity of lesions. Fresh lard was then given in amounts of 1 to 2 ounces daily either alone, as a spread, or mixed with sugar, peanut butter or some other palatable material. Raw linseed oil or corn oil was also used for some patients. The supplementary fat feeding was continued for one to three months until a reliable clinical evaluation of the response could be made. The response was considered "good" if the cutaneous manifestations either completely disappeared or nearly cleared. Otherwise the response was graded "fair," "poor" or "none." Simultaneously, changes in the degree of unsaturation of the fatty acids of the serum were determined, since earlier work had suggested that the serum fatty acids of patients with eczema tend to be less unsaturated than those of control subjects.[4]

The clinical response indicated a definite benefit in the majority of cases, especially in infants and younger children. Of 148 patients treated there were 60 in whom the results were good to excellent, 51 in whom the results were fair to good and 37 in whom the response was either poor or lacking. With respect to the response of different age groups, it was found that 40 per cent of the adults showed "poor" or no response, whereas only 36 per cent of the children and 12 per cent of infants responded unfavorably.

Studies on the blood lipids in 171 patients confirmed the earlier observation that the serum fatty acids are less unsaturated than those of control subjects, especially in infants. Whereas the iodine number of the serum fatty acids of normal subjects averaged about 100, that of the patients averaged from 80 to 95, depending on their age. The differences were found to be statistically significant. The serum iodine numbers tended to increase to normal values as the clinical condition improved following supplementation of the diet with fat.

The author's conclusion thus appears warranted that supplementary fat, such as lard or certain vegetable oils rich in unsaturated fatty acids, is definitely beneficial in the majority of cases of eczema, particularly in infants. However, they wisely emphasize that such therapy is not a complete substitute for good general and local therapy but should be regarded as a valuable adjunct to the accepted modes of treatment.

1. Burr, George O., and Burr, Mildred M.: J. Biol. Chem. **82**: 345 (May) 1929. Burr, George O.; Burr, Mildred M., and Miller, Elmer S., ibid. **97**: 1 (July) 1932.
2. Hansen, A. E.: Proc. Soc. Exper. Biol. & Med. **31**: 160, 1933.
3. Hansen, A. E.; Knott, Elizabeth M.; Wiese, Hilda F.; Shaperman, Eva, and McQuarrie, Irvine: Eczema and Essential Fatty Acids, Am. J. Dis. Child. **73**: 1 (Jan.) 1947.
4. Hansen, A. E.: Serum Lipids in Eczema and in Other Pathologic Conditions, Am. J. Dis. Child. **53**: 933 (April) 1937.

CONGENITAL TUBERCULOSIS

Hughesdon[1] has tabulated and classified 35 cases of congenital tuberculosis which have appeared in medical literature from 1935 to 1945 inclusive. Beitzke, quoted by Hughesdon, analyzed all published cases and classified them according to the site of the primary complex. He found 61 cases of proved congenital tuberculosis with pathologic lesions and 40 cases in which tubercle bacilli were found in the fetus without histologic changes. His criteria of proof of congenital tuberculosis in the infant were that (1) the tuberculous nature of the lesions in the infant must be proved; (2) a primary complex in the fetal liver is proof of the congenital nature of the tuberculous changes, since it can have arisen only from tubercle bacilli in the blood of the umbilical vein; (3) if there is no primary complex in the liver, the infection is congenital only if (*a*) tuberculous changes are found in the fetus in utero or at birth or a few days after birth and (*b*) in a child who lives longer than a few days if extrauterine infection can be excluded with certainty, the child being immediately separated from the mother and kept in an environment free from tubercle bacilli.

Apparently, therefore, during approximately the last seventy years 115 proved cases of congenital tuberculo-

1. Hughesdon, Mary R.: Congenital Tuberculosis, Arch. Dis. Childhood **21**: 121 (Sept.) 1946.

sis have been described in the literature including both cases in which pathologic lesions were present and those in which only a tuberculous bacillemia occurred. To these cases Hughesdon adds 4 cases of congenital tuberculosis which were observed in a children's hospital in England. The fact that 4 cases of congenital tuberculosis have been observed in one children's hospital during the last twelve years suggests that intrauterine or intrapartum infection of the fetus with tubercle bacilli may occur more frequently than hitherto believed. Infection of the fetus, according to Hughesdon, may take place when the mother's tuberculous lesion is minimal or even undetectable by present methods of investigation. This is consistent with the view that tuberculous bacillemia may occur at any time during a period of activity of an existing tuberculous focus, no matter how small. Tuberculous lesions in the placenta can release tubercle bacilli into the fetal blood spaces of the placenta, with subsequent infection of the fetus by way of the umbilical vein. Tubercle bacilli may also be liberated from a lesion in the placenta or membranes into the amniotic fluid, and the fetus may be infected by inhalation or ingestion of the fluid. Congenital tuberculosis is not necessarily fatal, as demonstrated by the author's reports of cases 3 and 4, in which death occurred at the ages of 13 and 27 months respectively and in which the diagnosis of congenital tuberculosis was not made until the postmortem examinations. In all 4 cases reported by the author there were primary complexes in both liver and lungs.

The true estimate of the incidence of congenital tuberculosis could be obtained only by routine postmortems of children dying from all causes.

Current Comment

POSTGRADUATE COURSES FOR PHYSICIANS

An important aid to the physician desiring to keep abreast of the progress of medicine is the offering of continuation courses throughout the country. Semiannually the Council on Medical Education and Hospitals of the American Medical Association publishes a list of postgraduate courses offered to physicians for the ensuing six months. In this issue of THE JOURNAL (page 626) and in next week's issue the courses listed cover the period from July 1, 1947 to Jan. 15, 1948. More than eight hundred courses offered by numerous institutions and organizations are listed. The medical schools take a prominent part in presenting these courses. In addition a number of courses, while not given by medical schools, will employ the facilities of medical schools. The wide usefulness of these listings is indicated by the tremendous demand for reprints, numbering regularly about a thousand per month. The institutions and individuals participating in these programs are rendering a great service to the profession and to the physician veterans.

THE HOSPITAL IN THE REHABILITATION OF THE HANDICAPPED

One of the great contributions of war medicine was the rehabilitation program in the service hospitals now being carried into the Veterans Administration hospitals. The fracture, the gunshot wound, the head and peripheral nerve injury and paraplegia received an integrated program of surgical treatment, physical therapy and conditioning, and graduated military activity, which prepared the patient for return to duty. When the residual disability prevented him from satisfying the demands of military service, educational and prevocational training was provided to prepare him for return to civil employment. Thus, whereas much of the rehabilitation service in World War I was carried on after the patient was discharged from the hospital, in World War II every attempt was made to obtain complete physical restoration and vocational preparation before he left the hospital. The advantage of an integrated and continuous program of this sort was of especial value with amputations. At the army and navy amputation centers, a five point program was followed. This included (1) the psychologic preparation of the patient, (2) a rational plan of surgical treatment which employed a few standard procedures such as the Syme amputation, the below the knee amputation, the Stokes-Gritti amputation and the above knee amputation, (3) the shrinking of the patient's stump with appropriate exercises of the stump and body musculature, (4) the selection and fabrication of a modern prosthesis and (5) of especial importance, the systematic and intensive training of the amputee in the use of this prosthesis. Prevocational and vocational training were carried out within the hospital framework so that discharge from the hospital meant return to an independent economic and social existence. During the war from 17,000 to 18,000 amputees received the benefit of this type of service. During the same period approximately 120,000 civilians lost their limbs from congenital deformity, disease and accidental injuries, 67,000 of them in industry. Yet few of these persons have enjoyed the advantage of an integrated and continuous program, either within the hospital or after discharge from the hospital. There is need for the establishment of rehabilitation centers where the amputee and all severely handicapped can receive the follow-up care which will lead to their return to employment. This need is being met in a small number of instances by the establishment of outpatient facilities designed to provide a limited program of after-care. More such centers are needed. Rehabilitation, after discharge from the hospital, however, is not enough. The within hospital program, as demonstrated in the service hospitals, is of paramount importance. Many hospitals are already equipped to carry on such a program and require only an organization to implement it. Such an organization can be developed by the creation of a rehabilitation committee consisting of one or more physicians interested in rehabilitation, the physical therapist, the occupational therapist, the social worker and the rehabilitation representative of the state rehabilitation commission. This committee can estab-

lish policies, supervise the program in action and carry on liaison with public agencies, thus providing a rapid turnover for its chronic cases and a full measure of treatment leading toward reemployment of its disabled patients. In a large hospital the services could be delegated by the committee to a rehabilitation officer, preferably a physician trained in physical medicine.

ARTERIOSCLEROSIS IN YOUTHS

An increasing number of reports on arteriosclerosis in infants and young adults has contributed recently to the accumulating evidence that this disease is not the inevitable consequence of senescence but the result of various endogenous and exogenous factors acting on the blood and the vascular tissues.[1] Recent observations on juvenile atherosclerosis deal mainly with coronary arterial disease in soldiers between the ages of 18 and 40 in the United States, England and Germany.[2] In the great majority of these cases the first and fatal attack of coronary obstruction was not preceded by any warning symptoms pointing to the presence of coronary sclerosis. As these soldiers had passed a more or less thorough medical examination, their deaths from partly advanced coronary disease is a rather sad commentary on the state and value of the available diagnostic methods. This realization is the more depressing as there is general agreement among the authors that coronary sclerosis in young persons is definitely more common than is usually assumed and that the incidence of this serious vascular disease has been on the increase during the last decades. Little definite information is available concerning the etiology of juvenile coronary sclerosis. French and Dock mentioned that 73 of their 80 patients had some degree of obesity pointing to a disturbance of the fat metabolism as the causative mechanism. Poe, however, noted only 1 of his 9 patients as obese. Newman characterized all of his 50 English soldiers with coronary occlusion as well built or obese. Infections of the throat and respiratory organs, as well as rheumatic and scarlet fevers providing a toxic or allergic mechanism, were mentioned by Newman and others. In a 6 weeks old infant that died of coronary sclerosis a hyperergic reaction developed on the basis of a drug allergy of the mother during pregnancy and caused the calcification and thrombosis in the coronary artery.[3] In many other cases of fatal coronary or general arteriosclerosis in infants chronic renal disease, hypervitaminosis D, hyperparathyroidism, hyperadrenalism and thromboangiitis obliterans were listed as causative factors.[4] A vasotoxic effect of nicotine associated with excessive smoking of cigarets was cited by Meessen and by Holzer and Polzer[5] as a significant etiologic factor in juvenile coronary sclerosis. The histologic changes observed in sclerotic coronaries in youths have been identical with those seen in persons of more advanced age. Thus, calcifications were not less common in the sclerosed vessels of the young than they are usually found in those of the old. Since it was noted that the early developmental stage of coronary sclerosis is often associated with an imbibition of the vascular wall by a fat free edematous fluid, fibrinoid swelling and active vascularization of all layers of the wall, an allergic origin of juvenile coronary sclerosis may not be infrequent. The not infrequent occurrence of fatal juvenile arteriosclerosis provides a forceful reminder that the prevention and therapeutic control of arteriosclerosis represents one of the most urgent problems of medicine.

1. Hueper, W. C.: Arteriosclerosis: A General Review, Arch. Path. **39**: 54 (Jan.) 1945.

2. Dock, William: The Predilection of Atherosclerosis for Coronary Arteries, J. A. M. A. **121**: 875 (July 13) 1946. French, A. J., and Dock, William: Fatal Coronary Atherosclerosis in Young Soldiers, ibid. **124**: 1233 (April 29) 1944. Poe, William D.: Fatal Coronary Artery Disease in Young Men, Am. Heart J. **33**: 76 (Jan.) 1947. Moritz, A. R., and Zamcheck, Norman: Sudden and Unexpected Deaths in Young Soldiers: Diseases Responsible for Such Deaths During World War II, Arch. Path. **42**: 459 (Nov.) 1946. Newman, M.: Coronary Occlusion in Young Adults, Lancet **2**: 409 (Sept. 28) 1946.

3. van Creveld, S.: Coronary Calcification and Thrombosis in an Infant, Ann. Pediat. **157**: 84, 1941.

4. Fields, Miriam H.: Medical Calcification of Arteries of Infants, Arch. Path. **42**: 607 (Dec.) 1946. Stryker, W. A.: Arterial Calcification in Infancy, with Special Reference to the Coronary Arteries, Am. J. Path. **22**: 1007 (Sept.) 1946.

5. Holzer, W., and Polzer, K.: Coronary Occlusion, Lancet **2**: 846 (Dec. 7) 1946.

DETERMINATIONS OF BLOOD VOLUME

In a procedure for the determination of blood volume, red cells containing radioactive iron are injected; the blood volume is determined from the degree of dilution of the injected cells and the hematocrit value. The radioactive red cells are formed in a suitable host following the oral administration of radioactive iron.[1] The blood volume was determined by this procedure on a series of 28 patients in a variety of clinical conditions. The volume differed in many cases from values obtained by the more generally used dye method by as much as 1 and 2 liters.[2] There appears to be no definite agreement as to which procedure yields the more reliable values. In the newer method the cell volume is determined directly and the whole blood volume is calculated from the hematocrit; in the other scheme the blood plasma volume is determined directly and the whole blood volume is calculated from the hematocrit. The larger values obtained by the dye method suggest that some of this dye is lost, perhaps through phagocytosis by the reticuloendothelial cells, by adsorption on the plasma proteins or in other less obvious ways. A rather constant difference in the blood volumes of healthy human subjects and in laboratory animals as obtained by the two methods has been attributed to the measurement by the radioactive red cell method of only "rapidly circulating plasma volume." However, estimations of blood volume by the use of carbon monoxide and with a dye method have been found to agree within about 10 per cent in healthy human and animal subjects.[3] The determination of blood volume would appear to be valuable in ascertaining the state of hydration of the body and the rate of formation of plasma constituents such as albumin. Until methods are more fully worked out, caution must be exercised in the interpretation of small variations in the values obtained.

1. Hahn, P. F.; Ross, J. F.; Bale, W. F.; Balfour, W. M., and Whipple, G. H.: J. Exper. Med. **75**: 221 (Feb.) 1942.

2. Meneely, G. R.; Wells, E. B., and Hahn, P. F.: Am. J. Physiol. **148**: 531 (March) 1947.

3. Root, W. S.; Roughton, F. J. W., and Gregersen, M. I.: Am. J. Physiol. **146**: 739 (Aug.) 1946.

ORGANIZATION SECTION

MEDICAL DEPARTMENTS OF THE ARMY AND NAVY

An Analysis of Pending Federal Legislation, Prepared by the Bureau of Legal Medicine and Legislation

Shortly after the Eightieth Congress convened, legislation was introduced to reorganize the Medical Departments of the Army and Navy. In the Senate two bills were introduced by the chairman of the Senate Committee on the Armed Services, S. 334 to establish the Medical Associated Sciences Corps in the Medical Department of the Navy and S. 504 to revise the Medical Department of the Army.

In the House several bills were introduced with similar objectives on which hearings were held. Following such hearings revised bills were proposed, H. R. 3215, introduced by the chairman of the House Committee on Armed Services, which would revise the Medical Departments of the Army and Navy, and H. R. 1943, introduced by Representative Smith of Maine, which would establish a permanent Nurse Corps and a Women's Medical Specialist Corps in the Medical Department of the Army.

Other bills have been introduced to provide for the procurement of physicians and surgeons in the Medical Department of the Army, S. 1143 and H. R. 3174, and to provide additional inducements to physicians and surgeons to make a career of the United States naval services, S. 1197 and H. R. 3254.

Army Medical Service Corps.—Title I of H. R. 3215 as reported to the House, which is similar to title I of S. 504, would establish in the Medical Department of the Regular Army a Medical Service Corps consisting of the Pharmacy, Supply and Administration Section, the Medical Allied Sciences Section, the Optometry Section and such other sections as the Secretary of War may deem necessary. The Secretary of War will be authorized to determine from time to time the strength of this corps.

The corps will consist of officers in the grade of second lieutenant to colonel, inclusive. There will be a chief of the corps appointed by the Secretary of War and assistant chiefs similarly designated who will be chiefs of sections.

Appointments from sources other than the Regular Army or its active reserve will be made from persons who are graduates from accredited schools of pharmacy, optometry or other schools or colleges who possess degrees in sciences allied to medicine or such other degrees as may be approved by the Surgeon General. A person holding a doctorate degree in sciences allied to medicine at the time of appointment may be credited with an amount of service equal to three years, for the purpose of determining grade, position on promotion list, permanent grade seniority and eligibility for promotion.

The Pharmacy Corps and the Medical Administrative Corps will be abolished. Officers of the Regular Army who hold commissions in the Pharmacy Corps will be transferred in grade to the Medical Service Corps. Persons holding temporary appointments or commissions in the Army of the United States permanently assigned or detailed to the Medical Administrative Corps, the Pharmacy Corps or the Sanitary Corps will be automatically assigned or detailed to the Medical Service Corps.

Navy Medical Service Corps.—Title II of H. R. 3215 would establish a Medical Service Corps in the Medical Department of the Navy with sections similar to those proposed for the corresponding corps in the Medical Department of the Army. The authorized strength of the corps will be 20 per cent of the authorized strength of the Medical Corps of the Navy. It will consist of staff officers in the grades of ensign to captain, inclusive. With certain exceptions, all appointments in the corps will be in the grade of ensign from those persons serving as commissioned warrant or warrant officers of the Hospital Corps of the Regular Navy and from other persons who possess such physical and other qualifications as may be prescribed by the Secretary of the Navy. Appointments from sources other than the Regular Navy will be from persons who are graduates of accredited schools of pharmacy, optometry or other schools or colleges with degrees in sciences allied to medicine or such degrees as may be approved by the Surgeon General. Persons holding a doctorate degree in sciences allied to medicine may be appointed in the grade of lieutenant (junior grade).

The Hospital Corps of the Navy.—Title III of H. R. 3215 provides that the authorized strength of the Hospital Corps of the Navy shall equal 3.5 per cent of the authorized enlisted strength of the Navy and Marine Corps and will consist of the following grades and ratings: commissioned warrant officers and warrant officers, Hospital Corps, and enlisted men classified as chief hospital corpsmen; hospital corpsmen, first, second and third class; hospital apprentices, first and second class. These classifications in enlisted ratings will correspond respectively to the enlisted ratings, seaman branch, of chief petty officers; petty officers, first, second and third class, and seamen, first and second class.

The President will be authorized to appoint as many warrant officers, Hospital Corps, as he may deem necessary from the ratings of chief hospital corpsman and hospital corpsman, first class. Warrant officers now in the Hospital Corps of the United States Navy and those hereafter appointed therein will have the same rank, pay and allowances allowed to other warrant officers.

Medical Associated Sciences Corps—Medical Department of Navy.—A bill introduced by the chairman of the Senate Committee on Armed Services, S. 334, proposes to establish the Medical Associated Sciences Corps as a constituent part of the Medical Department of the Navy. This corps would consist of not more than 205 officers of the grade of medical associated scientists who will have the rank of captain, commander, lieutenant commander, lieutenant or lieutenant (junior grade). Such officers will be staff officers, subject to all provisions of law relating to the advancement in rank and retirement of officers of the Medical Corps.

All appointments to the grade of medical associated scientists will be made by the President by and with the advice and consent of the Senate from male citizens of the United States who shall have received a doctorate degree in such sciences related to medicine as the Secretary of the Navy shall determine.

Army-Navy Nurses Act of 1947.—Another bill, H. R. 1943, which has already passed the House and Senate, would establish a permanent Nurse Corps and a Women's Medical Specialist Corps in the Medical Department of the Regular Army and a permanent Nurse Corps as a component part of the Medical Department of the Navy. The Women's Medical Specialist Corps would consist of a Dietitian Section, a Physical Therapist Section and an Occupational Therapist Section. These sections would perform such services as may be prescribed by the Secretary of War. The authorized strength of this corps will be in the ratio of nine tenths of a member thereof to every thousand persons in the total authorized strength of the Regular Army but not less than a minimum authorized strength as follows: 24 officers in the permanent commissioned grade of major and 385 other officers in the permanent commissioned grades of captain to second lieutenant, inclusive.

The report of the Senate Committee on the Armed Services pointed out the necessity for this legislation and summarized the principal features as follows:

"Under present legislation both army and navy nurses are occupying temporary commissioned rank. With the ending of the war emergency and without new legislation, the members of the Army Nurse Corps and the Women's Medical Specialist Corps in the Medical Department of the Regular Army, and of the Navy Nurse Corps, will revert back to relative rank and to the prewar scale of pay allowances, which, under the Pay Readjustment Act of 1942, began with the sum of $1,080 per annum and increased to the top pay of $1,800 per annum for a person who had served twelve years, and after which there were no increases. Major Gen. Norman Kirk, Surgeon General of the Army, Col. Florence A. Blanchfield, superintendent of the Army Nurse Corps, and Admiral Clifford A. Swanson, Surgeon General of the Navy, testified, during the course of the hearing on H. R. 1943, that a reversion to the prewar pay scale would result in a complete dissolution of the Army and Navy Nurses' Corps.

"Failure to enact appropriate legislation would place the medical branches of the armed services in the impossible position of attempting to compete with civilian nursing agencies that offer much more attractive salaries and less personal deprivation.

"Summary of principal features of H. R. 1943:

"1. Army and navy nurses and personnel of the Women's Medical Specialist Corps of the Army would be commissioned on a permanent status, the same as all male officers.

"2. Pay, leave, money allowances for subsistence and rental of quarters, mileage and other travel allowances, benefits and emoluments would be the same as for male officers.

"3. Provisions for promotion would be the same as for male officers except that army nurses and specialists above the rank of captain and navy nurses above the rank of lieutenant would be chosen by the selection boards.

"4. Retirement provisions would be the same as for male officers except that the retirement age is reduced to 55 years in the ranks above captain in the Army and above lieutenant in the Navy, and to 50 years in the rank of captain or below in the Army and lieutenant or below in the Navy.

"5. The proposed legislation would establish similar provisions for nurses of both the Army and Navy with exactly the same pay and allowances.

"6. The bill would not result in increased per capita expenditures over those maintained during the wartime period."

Procurement of Army Medical Officers.—Companion bills are pending to provide for the procurement of physicians and surgeons in the Medical Department of the Army, S. 1143 and H. R. 3174. This legislation proposes that the active duty base and longevity pay of each commissioned officer of the Medical Corps with less than thirty years' active service will be increased by $1,200 per year. The Secretary of War will be authorized to designate as specialists qualified commissioned officers. Any person so designated will be entitled, in addition to the pay and other allowances otherwise provided by law, to an increase of 25 per cent of his base and longevity pay while on active duty. There would be established in the Medical Department of the Regular Army four professorships in medicine, surgery, neuropsychiatry and preventive medicine. Appointments will be made by the President by and with the advice and consent of the Senate, and commissions will be given in the Medical Corps of the Regular Army to physicians and surgeons who have been certified as specialists by an American Specialty Board recognized by the Advisory Board for Medical Specialties and the Surgeon General of the Army. Such persons will be appointed in a grade not above that of colonel.

The Secretary of War will be authorized to employ civilian physicians in such numbers and for such periods of time as he may deem necessary to serve with the Medical Department of the Army. Persons so appointed would receive pay, according to the grade in which appointed, from $3,640 to $9,800. Any person so employed could be designated by the Secretary of War as a medical or surgical specialist, in which case he would receive, in addition to his basic pay, an allowance equal to 25 per cent of such pay subject to the limitation that the pay plus the allowance may not exceed $11,000.

The Secretary of War would also be authorized to employ physicians on a temporary full time, part time or fee basis, with the limitation that no temporary full time appointment may be made for a period of more than ninety days.

Naval Medical Officer Procurement Act of 1947.—Companion bills are also pending to provide additional inducements to physicians and surgeons to make a career of the United States naval service, S. 1197 and H. R. 3254. This legislation proposes that, in addition to pay, allowances or emoluments that they are otherwise entitled to receive, commissioned medical officers of the Navy Medical Corps will be paid the sum of $100 for each completed month of active service. Such sum will not be included in computing the amount of increase in pay authorized by any other provision of law or in computing retired pay. The total amount which may be paid to any one officer by virtue of this proposal may not exceed $36,000.

The Surgeon General of the Navy will be authorized to designate as specialists qualified commissioned Medical Corps officers of the Regular Navy and of the Naval Reserve who are certified as specialists by an American specialty board recognized by the Surgeon General. Officers so designated will receive an increase of 25 per cent of their base and longevity pay while on active duty. Such increase in pay will not be included in computing the amount of increase in pay authorized by any other provision of law or in computing retired pay.

Original appointments may be made by the President, by and with the advice and consent of the Senate, of permanent commissioned grades, with rank not above that of captain, in the Medical Corps of the Navy in such numbers as the needs of the service may require. Such appointments will be made only from civilian medical and surgical specialists who have been certified as specialists by an American specialty board recognized by the Advisory Board for Medical Specialists and by the Surgeon General of the Navy. The physicians and surgeons so appointed will be carried as additional numbers in rank but will not increase the authorized number of commissioned officers of the Medical Corps of the Regular Navy.

Washington Letter

(From a Special Correspondent)

June 11, 1947.

Support of Socialized Medicine Being Probed

A house expenditure subcommittee of which Representative Harness, Republican of Indiana, is chairman, is investigating charges that public funds were being spent to promote socialized medicine. The probe was part of congressional investigation of government publicity and alleged "propaganda" activities, which opened with accusations from Congressmen and denials by federal officials. Under discussion were "workshop health conferences" held in 1945 and 1946 in Chicago, St. Paul and Jamestown, N. D., which reportedly discussed public health insurance and other subjects and adopted resolutions favoring such insurance. The committee heard testimony that officials of various government agencies helped plan the conference.

Threatens Loss of German Science Secrets

Elimination of the appropriation for the Technical Information Bureau of the Department of Commerce may lose for the United States the benefits of almost the entire wartime output of German science. At Karlsruhe, Germany, and at 15 Canal street S.W., Washington, D. C., are warehouses crammed with millions of pages of scientific reports collected after the war by American investigating teams. The 250 experts working on the reports overseas may have to return home at once or risk being stranded, and the staff engaged on the reports here will have to be dismissed. Foreign Minister Molotov estimated the value of the scientific information at ten billion dollars. Documents already examined are reported to contain information worth billions to American industry and science.

Advocate Modernization of Hospitals

Representative Mary T. Norton, Democrat of New Jersey, has introduced a House bill asking Congress to let federal funds be used to modernize all nonprofit hospitals in Washington. This would be somewhat in conflict with House action last year in deciding that Washington should have a modern hospital center in which Emergency, Garfield and Episcopal hospitals were to participate. The House had voted down a recommendation that federal grants be authorized for hospitals not in the center. Mrs. Norton's bill would restore original Washington hospital improvement features sought by Federal Works Agency and local hospital officials.

Dr. Spencer Resigns as Chief of National Cancer Institute

The resignation of Dr. R. R. Spencer, chief of the National Cancer Institute, U. S. Public Health Service, has been announced. He will devote his full time to training young physicians in diagnosis and treatment of cancer. Surgeon General Thomas Parran announced that Dr. Leonard A. Scheele, assistant chief of the institute, is successor to Dr. Spencer, who is shedding heavy administrative work for training and research.

Laboratories to Explore Nuclear Science

The program outlined in the Atomic Energy Commission's report to Congress last January is reportedly being followed through establishment of a nationwide chain of laboratories to study continuously every field of nuclear science. The laboratories will, in addition to military and power uses of atomic energy, study the production and dissemination of radioactive isotopes for medical and other scientific research and study and experiment in radiation.

Compensation for Injured Federal Workers

The Senate Civil Service Committee is to get legislation seeking to increase compensation of federal employees seriously injured in line of duty. At present a totally disabled person gets a maximum of $116 per month, but the new legislation would increase this by at least a third. It is contended that government salaries have increased 35 per cent in the last few years.

Bureau of Information

LOCATION OF PHYSICIANS

Virginia Shuler
Chicago

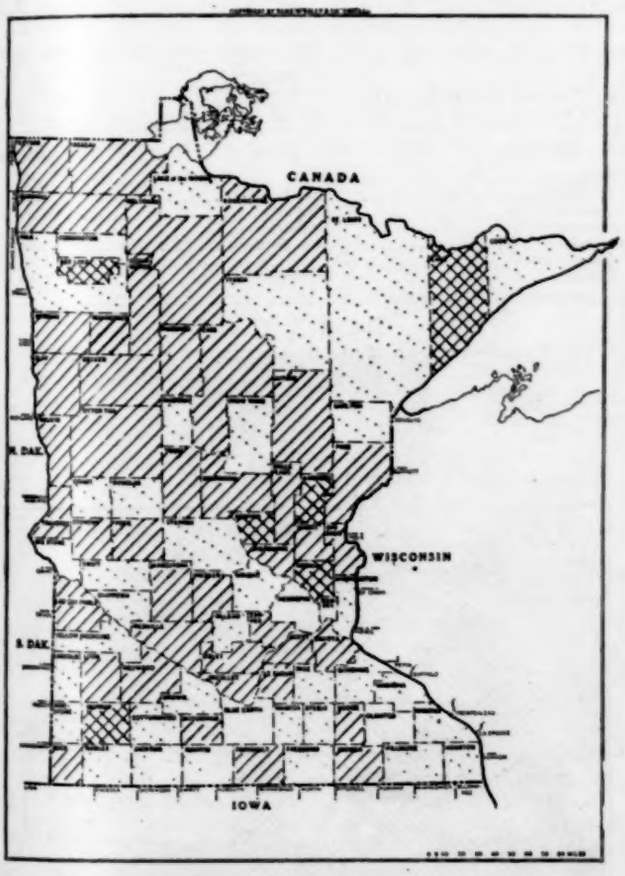
This is the third of a series of charts showing the trend in locations of physicians from April 1946 to January 1947; the first series appeared May 17, page 301, and the second series May 31, page 465.

"As to physician distribution Minnesota is quite well provided for as far as medical service is concerned. There are no areas in the state at the present time where needs for physicians are distressing. In most areas there is at least one physician within a radius of 20 miles; and there are no localities at present where one must travel farther than that for medical attention.

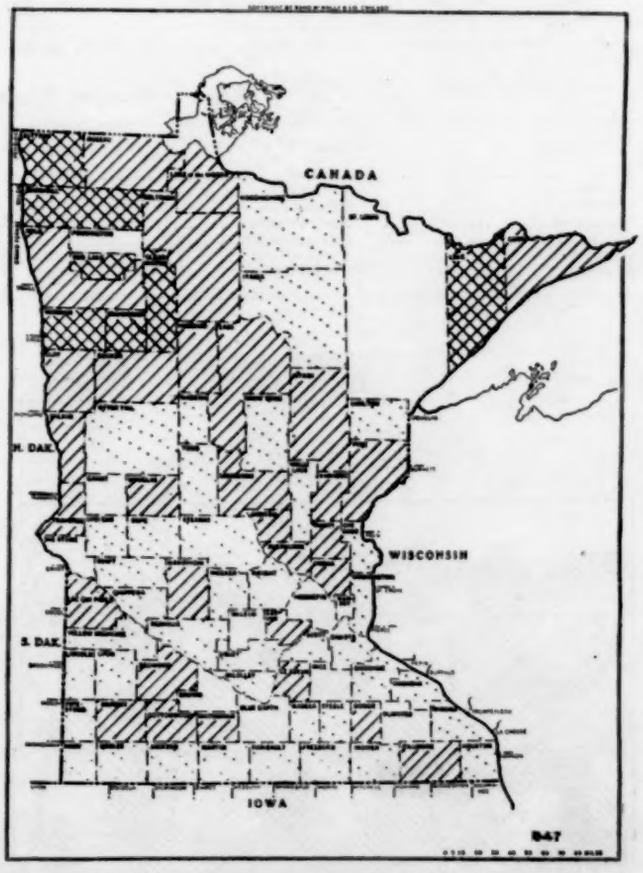
"At the present time there are some 1,000 young physicians, mostly returned medical officers, who are in training in Minnesota—that is, who are doing graduate work or taking continuation courses, residencies or fellowships. These young men will be released beginning about July 1 of this year and will continue to come out for the next two years. We presume that at least 50 per cent of these men will remain in this state and will meet whatever urgent demands there are for more physicians."

MR. R. R. ROSELL,
Executive Secretary,
Minnesota State Medical Association,
496 Lowry Medical Arts Building,
Saint Paul 2.

MINNESOTA—1946



MINNESOTA—1947



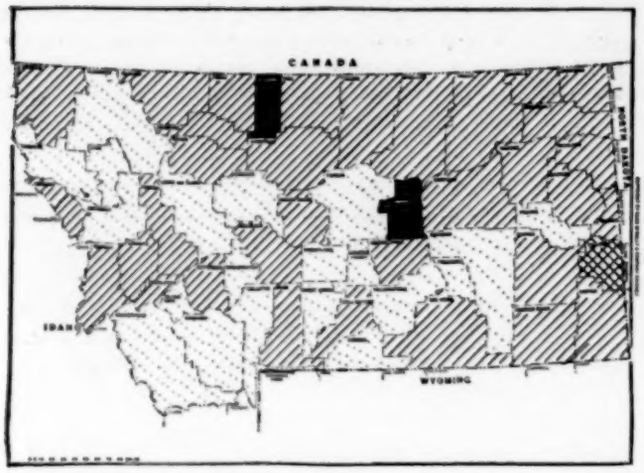
Population, based on 1943 estimated Census figures, per active physician (excludes teaching, research, hospital administration, public health and state hospitals) by county.

Key: Physician-population ratio by county: plain area 1-999, dotted area 1,000-1,499, striped area 1,500-2,999, checked area 3,000 and over, solid black area no doctor.

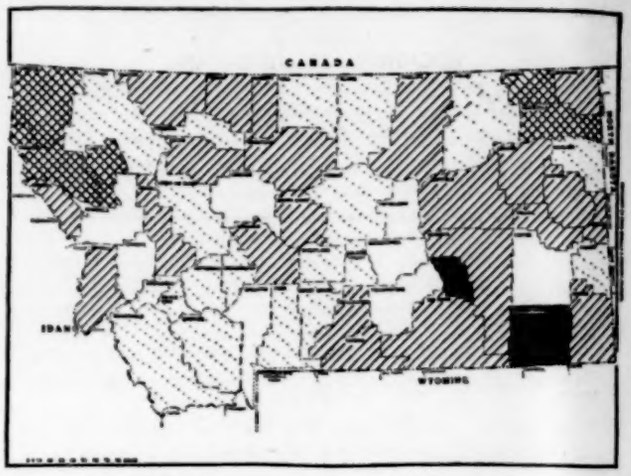
Areas in Minnesota Requesting General Practitioners

County	Town	Population	County	Town	Population
Aitkin	Tamarack	150	Mille Lacs	Isle	619
Blue Earth	Madison Lake	377	Nobles	Ellsworth	600
Cass	Backus	500		Wilmont	361
Douglas	Brandon	345	Pine	Finlayson	225
	Evansville	439	Red Lake	Okice	414
	Osakis	1,483	Redwood	Sanborn	580
Faribault	Wells	2,217	Scott	Jordon	1,422
Fillmore	Canton	450	Sibley	Henderson	900
Martin	Dunnell	239	Washington	Hugo	350
Mecker		19,277	Watanwan	Lewisville	301

MONTANA—1946



MONTANA—1947



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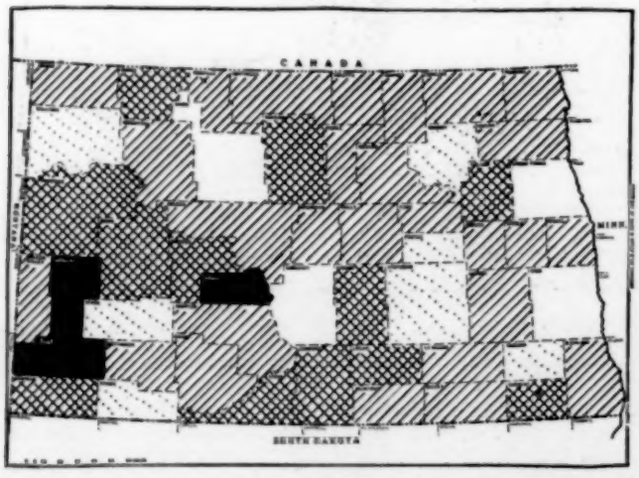
Areas in Montana Requesting General Practitioners

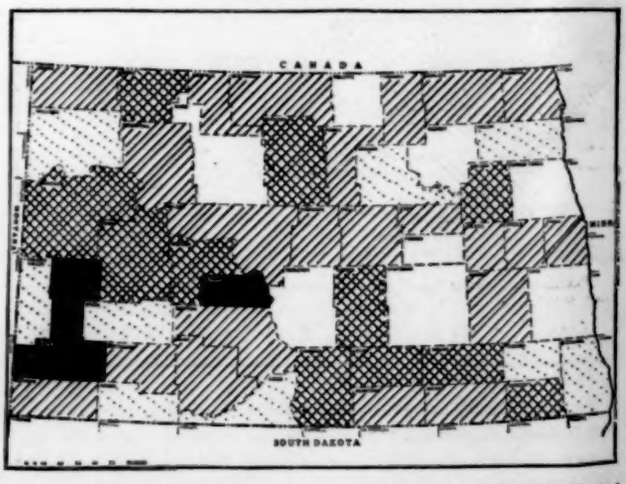
County	Town	Population	County	Town	Population
Blaine	Chinook	2,051	Meagher		2,237
Carbon	Fromberg	533	Ravalli	Stevensville	703
Carter	Ekalaka	719	Richland	Fairview	901
Chouteau	Fort Benton	1,227	Roosevelt	Culbertson	585
Flathead	Columbia Falls	637	Sanders	Hot Springs	661
Granite	Philipsburg	1,304	Sweet Grass		3,719
Madison	Twin Bridge	534	Toole	Shelby	2,538

Dr. H. T. Caraway, Secretary,
Medical Association of Montana,
217 Electric Building, Billings, Mont.

NORTH DAKOTA—1946



NORTH DAKOTA—1947



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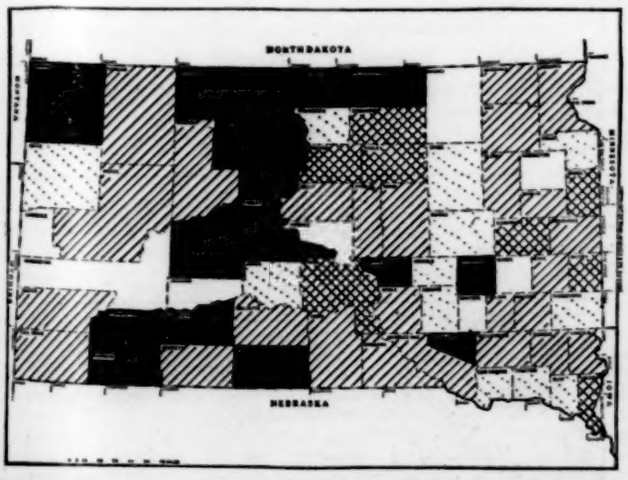
Areas in North Dakota Requesting General Practitioners

County	Town	Population	County	Town	Population
Barnes	Wimbledon	357	Morton	Glen Ullin	876
Bowman	Bowman	967	Nelson	Aneta	569
Burke	Flaxton	362		Lakota	1,000
Burleigh		22,736		McVille	548
Cass	Buffalo	245	Pembina	Pembina	703
Foster	McHenry	250	Ramsey	Edmore	453
Hettinger	New England	895	Stark	Belfield	871
LaMoure	LaMoure	990	Sheridan	Goodrich	476
Logan	Gackle	600	Steele	Hope	474
McLean	Washburn	901	Ward	Ryder	467
	Wilton	851	Williams	Williston	5,799

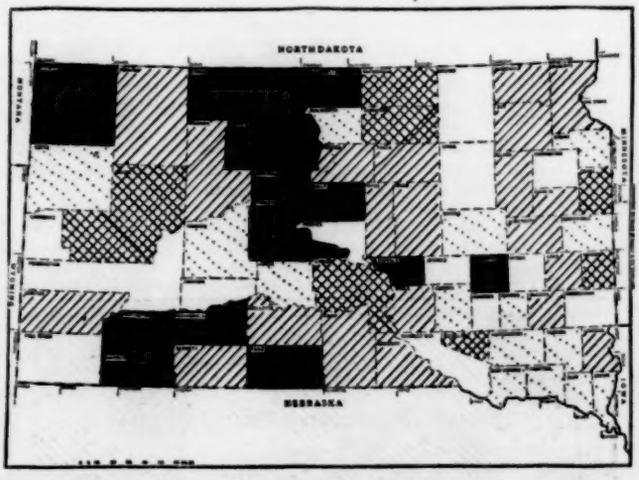
"The listing of physicians by county and the applying of the number per county against the county population in order to arrive at a ratio is as misleading in North Dakota as it is in other states. On this basis a number of our counties show but 1 active physician to 3,000 or more population. Actually in a number of cases the population within these counties live within a reasonably short driving distance of large medical centers which have 1 physician to each 999 or less population. Be that as it may, North Dakota is in actual need of additional physicians. A percentage of these are needed each in the rural communities for the obvious local care which may be afforded by the general practitioner, and also in the medical centers, to relieve the burden at those points caused by the actual desire of rural people to go to such centers for their more serious ailments. As the rural people continue to prefer the larger trading center, not only for the purpose of receiving medical care but also for the purpose of receiving other services and as a place to transact most of their ordinary business affairs, to that of the one time prosperous small village, the hope of extending medical services into the true rural community diminishes. Migration of physicians during the past year has been slight but continues to show the trend of movement from the rural community to the urban community. This no doubt will continue until sufficient physicians are available to satisfy the full demand in the medical centers, at which time the law of supply and demand should cause a greater spreading of doctors through the rural communities. According to recent surveys North Dakota has a somewhat adequate supply of larger general hospitals. The rural communities, however, could benefit greatly if money available under the Federal Hospital Construction Act were to be used in the construction of small buildings in the nature of a community health center where public health services could be combined with office space and facilities for a rural doctor with the inclusion of six to ten beds. Such an arrangement would make possible the distribution of public health services to the community, encouragement for a physician to settle in the community and facilities for emergency care and probably obstetric care in the local community. This in turn of course will relieve the burden on the overcrowded hospitals in the nine larger medical centers."

DR. L. W. LARSON,
Secretary,
North Dakota State Medical Association,
Little Building,
Bismarck, N. D.

SOUTH DAKOTA—1946



SOUTH DAKOTA—1947



Population, based on 1943 estimated Census figures, per active physician (excludes teaching, research, hospital administration, public health and state hospitals) by county.

Key: Physician-population ratio by county: plain area 1-999, dotted area 1,000-1,499, striped area 1,500-2,999, checked area 3,000 and over, solid black area no doctor.

Areas in South Dakota Requesting General Practitioners

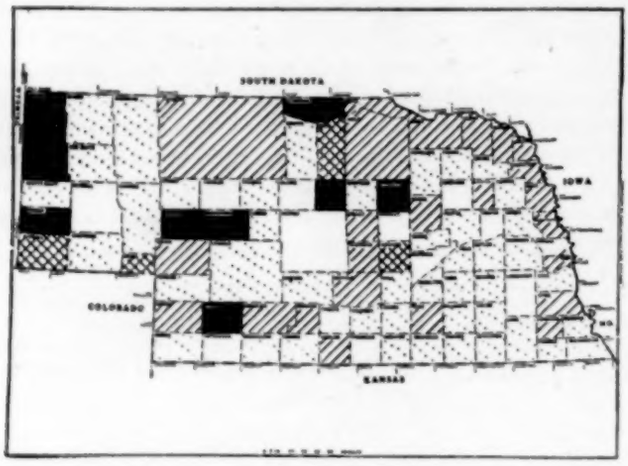
County	Town	Population	County	Town	Population
Beadle		19,648	Kingsbury and Beadle	Irquois	413
	Wessington	516	Lyman		
Bennett		3,983	McPherson	Leola	795
Brule	Chamberlain	1,500	Marshall	Langford	450
Davison		15,336	Meade		9,735
Edmunds	Bowdle	757	Mellette		4,107
Fall River	Hot Springs	4,083	Perkins	Lemmon	1,781
Grant		10,552	Potter		
Haakon	Philip	833	Sanborn		5,754
	Midland	282		Woonsocket	1,050
Hand		7,166	Stanley		
Hughes	Pierre	4,322	Sully		
Hyde			Todd		5,714
Jerauld		9,752	Tripp	Winner	2,426
	Wessington	1,352	Washabaugh		1,980
			Ziebach		

"All of our cities and towns seem to be adequately cared for, but some of our smaller villages need the services of a physician acutely.

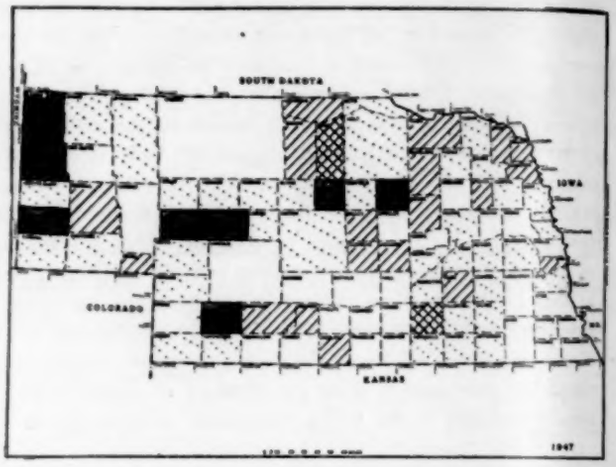
"As is true anywhere else, people in South Dakota are willing to travel to the larger centers of population where they can receive the best medical care but sometimes are unable to do so because of the conditions of the roads. In the spring and winter it is sometimes impossible for a sick person to go even 10 miles to see his physician."

Mr. John C. Foster,
Executive Secretary,
South Dakota Medical Association,
302 First National Bank Building,
Sioux Falls, S. D.

NEBRASKA—1946



NEBRASKA—1947



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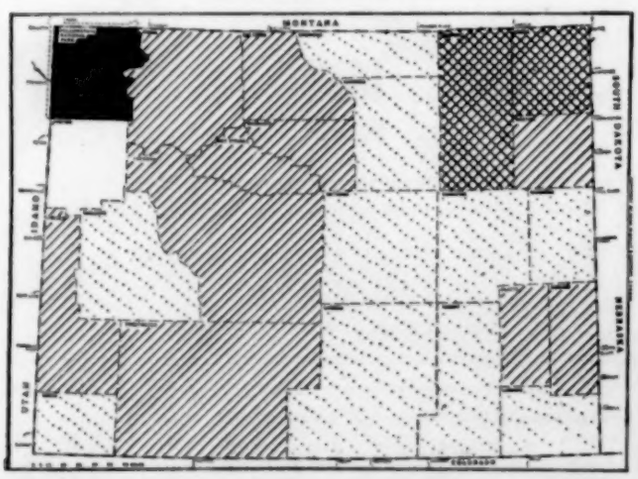
Key: Physician-population ratio by county: plain area 1-999, dotted area 1,000-1,499, striped area 1,500-2,999, checked area 3,000 and over, solid black area no doctor.

Areas in Nebraska Requesting General Practitioners

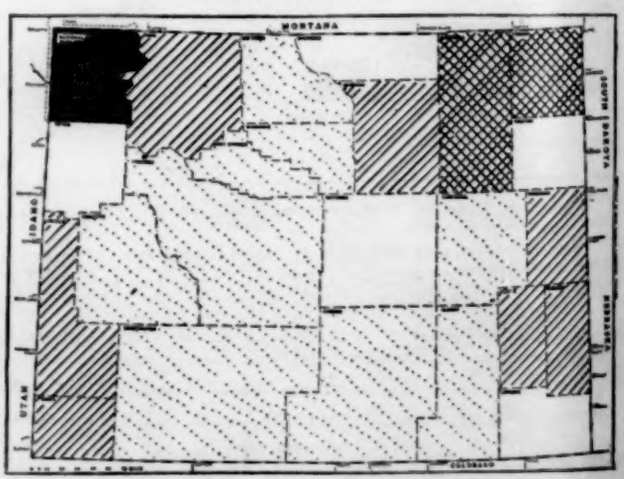
County	Town	Population	County	Town	Population
Boyd		6,000	Howard	Dannebrog	379
Buffalo	Shelton	983	Knox	Verdigre	556
Chase		5,310	Lincoln	Wallace	335
Dakota	Homer	477	Scotts Bluff	Scottsbluff	12,057
Deuel	Chappell	1,093	Thayer	Hebron	1,909

Mr. M. C. Smith, Executive Secretary,
416 Federal Securities Pldg., Lincoln, Neb.

WYOMING—1946



WYOMING—1947



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Key: Physician-population ratio by county: plain area 1-999, dotted area 1,000-1,499, striped area 1,500-2,999, checked area 3,000 and over, solid black area no doctor.

Areas in Wyoming Requesting General Practitioners

County	Town	Population	County	Town	Population
Sublette	Pinedale	647	Washakie		5,838
Sweetwater		19,407			

Dr. George E. Baker, Secretary,
Wyoming State Medical Society,
226 East Second Street, Casper, Wyo.

Medical Legislation

STATE LEGISLATION

California

Bills Passed.—S. 808, which passed the house May 29, to amend the **health and safety code**, proposes to require every licensed physician and surgeon or other person engaged in prenatal care of a pregnant woman, or attending such woman at the time of delivery, to obtain a blood specimen of such woman at the time of the first professional visit or within ten days thereafter and to submit such sample to an approved laboratory for a laboratory test for syphilis. S. 1026, which passed the senate May 26, 1947, to amend **the education code**, proposes to prohibit any instruction in sex relations, marital problems or like questions at any time prior to the twelfth grade. The proposal would further require that where such instruction is given it shall be conducted by a duly licensed physician and handled as an individual activity retaining the normal relationship of physician and patient.

Bills Enacted.—A. 229, which has become chapter 377 of the Laws of 1947, makes the testing of the sight and **hearing of school children** mandatory rather than permissive and provides that such tests shall be made only by duly qualified supervisors of health, such term not being defined. S. 569, which has become chapter 360 of the Laws of 1947, provides an appropriation of $250,000 to be expended by the University of California to conduct additional research on the origin, prevention and **cure of cancer.**

Connecticut

Bills Passed.—S. 133, which passed the house May 28, to amend the law relating to **osteopathy**, proposes to establish higher minimum requirements and more rigid supervision of the professional practice of osteopathy in the state. S. 169, which passed the house May 26, relating to the **practice of chiropractic**, proposes to require applicants for certification without examination to be graduates of approved schools, to meet the requirements of the state board of healing arts and to have three years of practice in the state in which they are licensed immediately prior to an application for a Connecticut license, except that persons discharged from the armed forces may have had three years of practice immediately prior to their induction.

Florida

Bills Passed.—H. 312, which passed the house May 23, to amend the law relating to the membership of the **state board of health**, proposes to authorize other than doctors of medicine to be members thereof, that is, "a licensed practitioner under the laws of the state of Florida of one of the healing arts for the treatment of human ills other than a doctor of medicine." H. 440, which passed the senate May 29, proposes to make it unlawful for tax collectors in the several counties to issue **state and county occupational licenses** to any person applying for a license to practice medicine in any of its branches unless and until proof of current qualification and competency, as established by certificate or license issued by the state boards duly constituted and legally authorized to determine qualification and competency, be exhibited at the time of making such application.

Bills Enacted.—H. 253, which became law without approval on May 27, authorizes persons to donate and give their eyes for **eyesight restoration** purposes by last will and testament and authorizes any state, county, district or other public hospital to purchase and provide the necessary facilities and equipment to establish and maintain an eye bank for restoration of sight purposes. S. 151, which became law without approval on May 26, amends the law relating to the **practice of massage** by redefining the meaning of the practice so as to include the use of electrical apparatus.

Michigan

Bills Passed.—H. 451, which passed the senate May 29, proposes the enactment of a law requiring the licensing, regulation and **inspection of hospitals** and related institutions and the appointment of an advisory institutional council. S. 201, which passed the house May 29, proposes to authorize the state commissioner of health to regulate and promulgate rules and regulations controlling the **humane use of animals** for the diagnosis and treatment of human and animal diseases, the advancement of veterinary, dental, medical and biologic sciences, and the testing and diagnosis, improvement and standardization of laboratory specimens, biologic products, pharmaceuticals and drugs. The proposal would further require that no person, firm or corporation shall keep or use animals for experimental purposes unless registered to do so by the state commissioner of health. S. 378, which passed the house May 29, proposes to require that all children prior to registration for the first time in any of the public or private schools, kindergartens, day nurseries or any other preelementary schools in the state shall give evidence that they have been **properly immunized** against diphtheria, whooping cough and smallpox. Exempted from the act are children whose parents or legal guardian have religious objections to such immunization.

Nebraska

Bill Passed.—L. B. 250, which passed the legislature June 2, proposes to provide for the licensing, inspection and **regulation of hospitals** and related institutions within the state and to create a hospital licensing council.

Bill Enacted.—L. B. 389, which was approved May 28, redefines the **practice of chiropody** by adding to the present definition the following words: "a person practices chiropody who holds himself out as being able to diagnose, treat, operate, or prescribe for any disease, pain, deficiency, deformity or physical condition of the human foot and who shall either offer or undertake by any means or methods to diagnose, treat, operate or prescribe for any disease, pain, deficiency, deformity, or physical condition of the same." The only limitation on the right to perform certain types of surgery would seem to be the amputation of the foot or toes whereas previously chiropodists were unable to make "correction of deformities requiring the use of the knife."

Pennsylvania

Bill Enacted.—S. 335, which has become chapter 128 of the Laws of 1947, amends the **law relating to consumer credit** by providing that the act shall not apply to nonprofit corporations organized under the laws of the state having memberships consisting exclusively of duly licensed physicians, surgeons and dentists operated exclusively for and by their members and engaged in, among other activities, the financing of personal obligations arising from the rendering of professional services by the members of such nonprofit corporations which are limited strictly to medical, surgical, dental, operative, diagnostic and treatment services or nursing and hospital care.

Rhode Island

Bill Passed.—H. 612, which passed the senate May 28, proposes the enactment of a **hospital survey and construction act** requiring a survey of hospital facilities in the state and the preparation of a program for the construction of additional needed facilities. The proposal would also require the appointment of an advisory hospital council and would authorize the director of the state department of health to apply to the Surgeon General for federal funds to assist in either the survey or the construction of new facilities.

Texas

Bill Passed.—H. 503, which passed the senate May 29, proposes the enactment of a state **hospital survey and construction act** requiring a statewide survey of hospital facilities and the preparation of a program for the construction of additional needed facilities. The proposal also requires the appointment of an advisory hospital council and the establishment of regulations for the purpose of obtaining federal funds to assist in survey and construction programs. The administration of this proposal would be under a division of hospital survey and construction in the department of health.

Wisconsin

Bills Passed.—S. 104, which passed the house May 29, proposes regulations for the licensing, inspecting and **regulating of hospitals** within the state. S. 509, which passed the senate May 27, proposes to authorize cooperative associations to establish and operate **nonprofit plans for sickness care**, including hospital care, for members through contracts with physicians, medical societies, hospitals and others. The proposal would further provide that any person covered by such plan should be free to choose for sickness care any medical or osteopathic physician licensed in the state who has agreed to participate in the plan and abide by its terms, and no physician or osteopath shall be required to participate exclusively in any such plan.

Coming Medical Meetings

Alaska Territorial Medical Association, Fairbanks, July 28-30. Dr. William J. Blanton, Juneau, Secretary.

American Neurological Association, Atlantic City, Marlborough-Blenheim Hotel, June 16-18. Dr. Walter O. Klingman, 195 Ft. Washington Ave., New York 32, Secretary.

American Physiotherapy Association, Pacific Grove, Calif., July 6-12. Miss Mildred Elson, 1790 Broadway, New York 19, Secretary.

American Urological Association, Buffalo, N. Y., Hotel Statler, June 30-July 3. Dr. Thomas D. Moore, 899 Madison Ave., Memphis 3, Tenn., Secretary.

Idaho State Medical Association, Sun Valley, June 16-19. Dr. William B. Handford, Caldwell, Secretary.

Maine Medical Association, York Harbor, Marshall House, June 22-24. Dr. Frederick R. Carter, 142 High St., Portland 3, Secretary.

Minnesota State Medical Association, Duluth, June 30-July 2. Dr. B. B. Souster, Lowry Medical Arts Bldg., St. Paul 2, Secretary.

Montana, Medical Association of, Missoula, June 26-28. Dr. H. T. Caraway, 115 N. 28th St., Billings, Secretary.

National Tuberculosis Association, San Francisco, June 16-19. Dr. F. D. Hopkins, 1790 Broadway, New York 19, Executive Secretary.

New Hampshire Medical Society, Portsmouth, Hotel Wentworth, June 19-20. Dr. Carleton R. Metcalf, 5 South State Street, Concord, Secretary.

Wyoming State Medical Society, Sheridan, June 23-25. Dr. George E. Baker, 226 E. 2d St., Casper, Secretary.

GOVERNMENT SERVICES

ARMY

ANNOUNCE COURSE IN AVIATION MEDICINE

The recall of twenty Medical Corps Reserve Officers annually for a period of ninety days to attend a course of instruction and training in aviation medicine is announced by the War Department.

The course, which will be presented at Randolph Field, Texas, covers the principles and practice of medicine as applied to aviation and the performance of the "64" Physical Examination for Flying. Each graduate will receive a certificate designating him an aviation medical examiner.

Applicants must be under 40 years of age, meet minimum physical requirements for flying and have an efficiency index of 4.0 or above and be not currently designated a flight surgeon or aviation medical examiner. The first class will begin October 6 and extend through December 12. Government quarters will be available at Randolph Field for students enrolled in the course; facilities will not permit quarters for dependents. Applications for this training should be made by letter, accompanied by a copy of the WD AGO 64, "Physical Examination for Flying," to the Office of the Surgeon General, Attention: Military Personnel Division not later than August 15.

TIME EXTENDED FOR REGULAR ARMY COMMISSIONS

All officers and former officers of the Medical and Dental Corps of the Army will have until the end of July to apply for Regular Army commissions, the War Department has announced. Extension of time for applications for commissions for doctors and dentists was granted as a result of shortages in these classifications in the first three increments of the Regular Army Officer Integration Program. Earlier it was announced that sanitary and medical administrative officers with certain specialties would be allowed additional time in which to file for integration.

Any medical or dental officer who is now on active duty or who saw service with the Army during World War II hostilities will be eligible to submit his application to the Adjutant General. Former officers should address correspondence to the Adjutant General, Attention: AGSO-R, Washington 25, D. C. Applications from officers now on active duty may be submitted through military channels.

PUBLIC HEALTH IN JAPAN

The War Department announces that the military government of the Ryukyus on February 10 directed the establishment of leprosariums in the Ryukyus to provide complete quarantine and treatment of persons with leprosy in the communicable stage. It was estimated that there were about 250 leprous persons in the northern Ryukyus who would be confined to the Amami-O-Shima.

Diphtheria immunization for all children in the southern Ryukyus between the ages of 6 months and 10 years is in progress and 11,000 had been immunized by the end of February.

A separate public health department was set up in the northern Ryukyus, which began functioning March 1.

The number of Ryukyuans on relief in February was 42,623, a decrease from 58,000 in December. Increased and stabilized employment, along with tightening of relief requirements, counted for the relief increase.

MEDICAL EXHIBIT OPEN TO PUBLIC

The Exhibit Section of the Army Medical Museum has been expanded and is now open to the public in new quarters on Independence Avenue between 8th and 9th streets S.W., Washington, D. C. New quarters became necessary because of the acquisition of much new material. Exhibits on various diseases, comparative anatomy and embryology are on display, in addition to historical collections of coins, stamps and medical instruments. Current medical topics of interest are in preparation and will be opened to the public from time to time. These will include a large section on tropical diseases, collections of weapons and moulages depicting military injuries. Special sections containing exhibits relating to veterinary medicine and dentistry and other specialized phases of medicine are of particular interest.

PERSONAL

Vernon Tate, Ph.D., honorary consultant to the Army Medical Library and for many years chief, division of photographic archives and research, National Archives, Washington, D. C., will leave the National Archives to become librarian at the Massachusetts Institute of Technology, Cambridge, where he will direct a campaign to increase greatly the scientific holdings of that library.

ARMY AWARDS AND COMMENDATIONS

Colonel James C. Kimbrough

The Legion of Merit has been awarded to Col. James C. Kimbrough, M. C., U. S. Army, for exceptionally meritorious conduct in 1945. As commanding officer of Percy Jones Convalescent Hospital from April 23, 1945 to Dec. 23, 1945, states the citation, by virtue of his farsightedness, initiative, broad experience and attention to duty, he was responsible for the proper reorganization and enlargement of this hospital in the face of rapidly changing situations. Without benefit of previously approved plans he reorganized the hospital so that it fulfilled, admirably, existing as well as future needs. He selected and trained large numbers of personnel to fit the ever varying needs of the hospital. As a result of perseverance, innate affability and desire at all times to help patients, he raised the position of the Percy Jones Convalescent Hospital to the highest attainable, making it a constant source of pride to the Medical Department. Dr. Kimbrough graduated from Vanderbilt University School of Medicine in 1916 and entered the military service July 20, 1917.

Captain Orlo G. McCoy

The Bronze Star Medal has been awarded to Capt. Orlo G. McCoy, M. C., A. U. S., of Canton, Pa., who was battalion surgeon, 253d Armored Field Artillery Battalion, in which position he performed services beneficial to his organization in combat against the enemy from January to May 1945 in Luxembourg, Germany, Belgium and Czechoslovakia. The citation relates that he cared for the sick and wounded and gave expert medical attention to many casualties under fire throughout the battle of Bastogne and other important engagements on both sides of the Rhine. It states, further, that through his exceptional initiative, professional ability and wise counsel Captain McCoy aided greatly in keeping the health and morale of his unit at a high level and made an important contribution to its successful combat operations. Dr. McCoy graduated from the University of Pittsburgh School of Medicine in 1940 and entered the military service Oct. 1, 1942.

Lieutenant Colonel Sidney Vernon

The Bronze Star Medal has been awarded to Lieut. Col. Sidney Vernon, M. C., A. U. S., of Waltham, Mass., who, according to the citation, performed meritorious services on July 15, 1944 as a prisoner of war at Manila, Philippine Islands. By fearlessly requiring Japanese guards to permit him to remove stifling hatch covers from holds, and to rotate groups of prisoners on deck, he undoubtedly saved many Americans from suffocation. Dr. Vernon graduated from the Long Island College Hospital in 1930 and entered the service in July 1941.

NAVY

TRAINING IN MEDICAL ASPECTS OF ATOMIC ENERGY

In cooperation with the Committee on National Emergency Medical Service of the American Medical Association in the formulation of plans for national defense, the Navy is carrying out research and training personnel in the field of radiologic safety.

In December 1946 a six weeks intensive course in radiologic safety for medical officers was conducted at the Navy Department, Washington, D. C., at the Naval Medical Research Institute, Bethesda, Md., and at the Manhattan Engineer District Laboratories and Plants at Rochester, N. Y., and Oak Ridge, Tenn., for the purpose of training key personnel to be used in the indoctrination of additional personnel. Several of those who received the basic training are now receiving advanced training in radiation physics and chemistry, radiologic safety, nuclear physics and allied sciences in civilian institutions.

A number of trained navy medical officers are being used as instructors at the radiologic safety school for line officers which is being conducted at Treasure Island, Calif., and are teaching subjects relating to aspects of ionizing radiation.

Navy laboratories have been established in several localities to develop methods for the prevention of radiation injury to those who are making a study of the target vessels used in the Bikini bomb tests. At the Naval Medical Research Institute studies are being conducted concerning the biologic effects of radiation on the laboratory animals employed in the tests. In this connection the Bureau of Medicine and Surgery will present an exhibit on "The Medical Aspects of the Development and Utilization of Atomic Energy" at the Centennial Celebration in Atlantic City, June 9-13.

In an effort to provide essential information to medical personnel, the Bureau of Medicine and Surgery is now preparing a manual on radiologic safety for all medical officers (including Reserve officers on active and inactive duty), nurses and Hospital Corps personnel. This will contain the basic information not only on nuclear physics but also on certain medical aspects of atomic energy. Those who show interest and aptitude in this specialized field will be given advanced, personalized instruction.

It is believed that within a few months a faculty of well trained naval medical officers may be assembled for the purpose of giving a combined basic and advanced course in the medical aspects of atomic energy. The date of this course will be announced later.

PLASTIC SURGERY FACILITIES

The Surgeon General of the Navy, Rear Admiral Clifford A. Swanson, has offered all facilities available in plastic surgery at the U. S. Naval Hospital, Houston, Texas, to aid in the reconstruction work of the burned patients of Texas City, following the disaster of April 16. This offer follows an announcement by Dr. I. Daniel Shorell of New York that he was calling for volunteers in the field of plastic surgery to help with the plastic work on the burn victims of that city. There are 350 persons in the hospitals of Texas City who need plastic surgery and many others who suffered disfiguring wounds. Admiral Swanson made this offer to both Dr. Shorell and Mayor J. C. Trahan of Texas City in order that the Navy might assist in this program as it did during the first few hours after the explosion.

VETERANS ADMINISTRATION

DEPENDENTS OF DECEASED VETERANS

The Veterans Administration reports that nearly 879,000 dependents of 557,000 deceased veterans of all wars and peacetime service are receiving compensation and pension checks from the Veterans Administration at the rate of over $32,000,000 a month; 396,000 are dependents of deceased World War II veterans. Of these, all but 3,525 are receiving compensation as the result of service connected death of the veteran; 363,000 are beneficiaries of deceased World War I veterans. Only 96,000 of these receive benefits resulting from service connected deaths. The rest are being compensated in cases of veteran deaths which did not result from service in the armed forces. The rolls also include 78,000 dependents of deceased Spanish-American War veterans, 19,000 from the Civil War, 2,345 from the Indian wars, 47 from the Mexican War and nearly 20,000 dependents of veterans who died in peacetime service. Of the dependents 372,000 are widows, 261,000 are children and 246,000 are parents of deceased veterans.

REORGANIZE NEW YORK CITY CLINIC

The New York Regional Veterans Administration has about completed reconstruction and administrative reorganization of its outpatient clinic at 252 Seventh Avenue, which regional office in March gave 87,200 treatments to 24,533 veterans. All types of illness are treated at the clinic by the staff of eighty full time doctors, seventeen dentists, twelve nurses, two hundred and forty-one technicians, seventy-nine consultants and numerous part time professional and subprofessional personnel in addition to the administrative staff. As of May 24 there were 16,241 requests for examination. Efforts were being made by night work to reduce this backlog so that veterans will no longer have to wait any longer than they would have to wait in a private physician's office. According to the New York *Times* an appointment system therefore has been instituted. Before the facilities were ready many of the men were sent to private physicians, but now only those are sent to private physicians that would suffer hardship if they had to come to the clinic. The potential veteran load for this area is estimated at 964,945 for the New York office and 335,839 for Brooklyn. A clinic will be opened in Brooklyn at 35 Ryerson Street during the summer.

NUMBER OF DISABILITY COMPENSATIONS OR PENSIONS

Living veterans receiving disability compensation or pensions now number 2,328,000. Their benefit checks total about $114,000,000 per month; 1,736,000 are World War II veterans, of whom all but 3,000 have service connected disabilities. The remainder is made up of 432,000 World War I veterans, 116,000 from the Spanish-American War, 99 from the Civil War, 873 from the Indian wars and 43,000 veterans disabled in peacetime service. The bulk of World War II claims, 1,208,000 cases, has been added to the rolls in the twenty months since VJ day. The number of new World War II disability claims filed per month has declined slowly from 70,000 in September 1946 to 50,000 last month. New awards in April totaled 12,638 cases, indicating that some 10,000 previously approved World War II awards were dropped during that month.

PERSONAL

Dr. J. A. Rosenkrantz has been appointed chief, outpatient department, Veterans' Hospital, Bronx, N. Y. He is a graduate of Columbia University College of Physicians and Surgeons, a specialist certified by the American Board of Internal Medicine and in the recent war served as commanding officer of an advance section of a medical laboratory and as chief of the medical service of a station hospital.

Dr. Joseph L. Kubanek, Detroit, has been appointed chief of the neuropsychiatry division at the veterans hospital, Dearborn, Mich. Dr. Kubanek for many years on the staff of the Wayne County General Hospital, has been certified by the American Board of Psychiatry and Neurology.

Medical News

(Physicians will confer a favor by sending for this department items of news of general interest: such as relate to society activities, new hospitals, education and public health. Programs should be received at least two weeks before the date of meeting.)

DISTRICT OF COLUMBIA

Cancer Clinic for Children.—A new clinic for children with suspected cancer has been opened in Gallinger Municipal Hospital with funds from the National Cancer Institute of the United States Public Health Service. Its services are available to pediatricians throughout the district for examination, tests and diagnosis of children with abnormal growths. It is open every Wednesday at 12:30 p. m. Dr. Roy Hertz, Bethesda, Md., endocrinologist of the National Cancer Institute, is director.

Washington Diabetes Association.—The newly organized affiliate of the American Diabetes Association, organized in Washington for educational and scientific research purposes, consists of two groups: the Clinical Society, made up of qualified practitioners in the Washington metropolitan area or the state or county medical society in which they reside and physicians in military service or governmental departments and research workers in any field of medicine or its allied sciences. Associate members consist of dietitians, laboratory technicians, nurses and social workers. The Lay Society is made up of diabetic patients and their relatives and other laymen interested in the subject. Dr. John A. Reed is president and Dr. J. Ross Veal secretary-treasurer.

GEORGIA

University News.—Jose F. Nonidez, Sc.D., professor of anatomy, Cornell University Medical College, New York, on July 1 will succeed the late Dr. Joseph Krafka as head of the department of microscopic anatomy at the University of Georgia School of Medicine, Augusta.

Cancer Detection Clinic.—The Atlanta Cancer Detection Center has been organized by the Georgia Division, American Cancer Society, in space provided by the Sheffield Clinic, Georgia Baptist Hospital, Atlanta. Patients are seen by appointment only. No treatment is given.

IDAHO

State Medical Meeting at Sun Valley.—The annual session of the Idaho State Medical Association will be held in Sun Valley, June 16-19, at the Challenger Inn under the presidency of Dr. George C. Halley, Twin Falls. The scientific program will be provided by members of the faculty of Harvard Medical School, Boston: Drs. C. Sidney Burwell, internal medicine; Alan R. Moritz, legal medicine and pathology; Edward D. Churchill, surgery; Merrill C. Sosman, radiology; J. Hartwell Harrison, urology. Among the subjects to be reviewed are x-rays in the examination of the gastrointestinal tract; advances in the diagnosis and treatment of liver diseases; nature and treatment of surgical shock; neoplasms of the kidney: their differential diagnosis and treatment; management of high blood pressure; medical investigations of obscure and suspicious deaths in the interest of public safety, and neophrolithiasis: recent advances in diagnosis, treatment and prevention. There will be round table discussion groups for luncheon Monday, Tuesday and Wednesday with one of the guest speakers at each table. The annual banquet will be in the Lodge dining room Tuesday at 8:15 p. m. The Women's Auxiliary will meet June 16-19 also.

ILLINOIS

Five Deaths in Typhoid Epidemic.—The fifth death from typhoid in an epidemic that began early in April in Christian County was reported June 4. Baxter K. Richardson, senior administrative officer of the state board of health, said that he had received reports of 43 cases, all of which have been traced to an ice cream handler in Palmer. The state health department reported that the carrier had sold his business and returned to former employment as a steelworker elsewhere after agreeing to a modified quarantine.

Chicago

Epidemic Keratoconjunctivitis.—The Chicago Medical Society reports that several cases of epidemic keratoconjunctivitis have been reported in the Chicago area. In 1943 this disease swept eastward from the west coast and reached the epidemic stage. All suspected cases should be placed under immediate medical treatment and be reported to the health department.

Nursing Scholarships for High School Girls.—The Chicago Chapter, American Red Cross, will award student nursing scholarships to four senior high school girls of advanced standing who have taken the Red Cross Home Nursing training in their school course. The scholarships will cover all tuition to the nursing school selected plus a monthly stipend for a period of three years.

Society Elections.—The Chicago Pediatric Society has elected the following officers for 1947-1948: Dr. H. William Elghammer, president; Dr. John L. Reichert, vice president; Dr. Alvah L. Newcomb, secretary, and Dr. Craig D. Butler, treasurer.——At the ninetieth annual meeting of the Chicago Academy of Sciences, May 12, Dr. Nathan Smith Davis was reelected president; William F. Henderson, Ph.D., and Leslie Arey, Ph.D., vice presidents.

Personal.—Dr. Andrew C. Ivy, vice president of the University of Illinois, left June 2 for Nuremberg, Germany, to serve as adviser at the trials of Nazi doctors charged with crimes of a medical nature, serving as a special consultant to the secretary of war. He will return in three weeks. Dr. Ivy has made two previous trips to Nuremberg, having served as the United States representative on an international commission which investigated Nazi human experiments last July and having testified on the ethical principles of medical investigations, studies and experiments conducted by Nazi doctors on trial last January.

INDIANA

One Case of Smallpox at Elkhart.—Smallpox developed in a high school student in Elkhart late in April. Dr. Ivan J. Markel, secretary, City Board of Health, reports that no other case has developed and that the source of infection could not be determined.

Tumor Registry.—The Indiana Cancer Society, in collaboration with the state board of health and the cancer committee of the state medical association, is setting up a tumor registry. It will develop a roster of all verified cases of cancer which have been hospitalized within a given period. There are seven hundred and thirty fully classified histories on file now.

Dr. Barrett to Head Bureau of Local Health.—Dr. Daniel C. Barrett, Bloomington, director, southeastern branch office, Indiana State Board of Health, has been appointed director of the Bureau of Local Health Administration. Dr. Barrett, a graduate of Indiana University School of Medicine, Bloomington, also holds a Master of Public Health degree from Johns Hopkins University, Baltimore. He has served as a medical director of city, county and district health departments in Iowa, Kansas and Indiana, and during the recent war was with the U. S. Public Health Service.

KENTUCKY

Rural Medical Scholarship Fund Exceeds Goal.—The statewide campaign to raise a rural medical scholarship fund of $100,000 has exceeded its goal by over $50,000. The campaign sponsored by the Kentucky State Medical Association and the University of Louisville School of Medicine ended with a dinner May 8, at which H. Fred Wilkie, chairman of the drive, presided. The campaign, launched last fall, was aimed to aid medical students by lending money for tuition on their pledge that they practice for a while in Kentucky's rural areas. According to the state department of health, unless more young doctors go into rural practice in Kentucky immediately there will be only 481 active practicing physicians in all of rural Kentucky, or 1 doctor to 4,159 people, as compared to 1 for every 1,500 considered necessary for adequate medical care. Besides Mr. Wilkie, Senator Henry Ward, Paducah, has been vice president and Dr. Irvin Abell, Louisville, headed the finance committee. Dr. Carl C. Howard, Glasgow, has been chairman of the fund's board of trustees.

MARYLAND

Society News.—At the semiannual meeting of the Baltimore City Medical Society April 11 Dr. William G. Lennox, assistant professor of neurology, Harvard Medical School, Boston, discussed "The Modern Treatment of Epilepsy."

Hospital Sesquicentennial.—Spring Grove State Hospital, Catonsville, the third oldest hospital for the treatment of the insane in the United States, celebrated its one hundred and fiftieth anniversary May 8 with an all day scientific program. Organized in 1797 for the medical treatment of seamen, it has grown to be a hospital of 2,214 beds.

MICHIGAN

Occupational Therapy Teaching Center.—Wayne University College of Medicine, Detroit, announces the opening of a new teaching center in Grace Hospital for its occupational therapy curriculum. Although the curriculum utilizes the facilities of three of Wayne's colleges and many of Detroit's clinical training facilities, the professional training itself will be offered at the new center. Medical phases of the instruction are to be directed by Dr. Max K. Newman, a psychiatrist at the hospital and a member of the Wayne faculty of medicine.

Personal.—Dr. Adolph T. Rehn, assistant medical superintendent of the State Home and Training School at Lapeer, has been appointed superintendent. A graduate of Wayne University College of Medicine, Detroit, he has been assistant physician and director of the feebleminded at the state hospital at Newberry at various times.——Dr. Fred O. Henker, formerly of the U. S. Public Health Service, has been appointed director of the Michigan Venereal Rapid Treatment Center at Ann Arbor to succeed Dr. Clement A. Smith, who has joined the staff of the University of Michigan Hospital.

Grant for Training Practical Nurses.—Wayne University's College of Nursing has received a grant of $26,400 from the W. K. Kellogg Foundation to finance a three year program in the training of teachers of practical nursing. This is the second major grant the foundation has made this year to the College of Nursing. A grant of $60,000 for the development over a three year period of advanced programs in medical, surgical and public health nursing was reported last January. The purpose of the new program will be to train nurse instructors who will be qualified to develop courses of instruction throughout the state for the training of practical nurses. The plan has been recommended jointly by the Michigan Council on Community Nursing, the Michigan Department of Public Instruction and the National Association for Practical Nurse Education.

NEW HAMPSHIRE

State Medical Meeting at Newcastle.—The annual meeting of the New Hampshire Medical Society will be held at the Hotel Wentworth, Newcastle, June 19-20 under the presidency of Dr. Ralph W. Tuttle, Wolfeboro. Round table conferences will open at 10 o'clock each morning, with general meetings following. Guest speakers include:

Dr. Hart E. Van Riper, New York, Poliomyelitis: Problems and Treatment.
Dr. Harrison L. McLaughlin, New York, Dislocations of the Shoulder.
Dr. Sara M. Jordan, Boston, The Peptic Ulcer Problem.
Dr. Dwight E. Harken, Boston, Surgery of the Heart.
Dr. Yale Kneeland Jr., New York, Antibiotics.
Dr. Harold W. Brown, New York, Indications for Early Surgical Correction of Strabismus.
Dr. John E. Howard, Baltimore, Male Hormone Deficiencies.
Dr. Nicholson J. Eastman, Baltimore, Episiotomy.
Dr. James R. Miller, Hartford, Conn., Internal Public Relations in Medicine.
Dr. Leland S. McKittrick, Boston, Clinical Aspects of the Surgical Gallbladder.

On Thursday night Harry H. Haight (MC), U.S.N., will present a technicolor movie of the Bikini incident. Friday afternoon fifty year membership certificates will be presented to Drs. Charles F. Nutter, Nashua, and Vladimir N. Sikorsky, Salem. An informal banquet will be held Friday at 7 p. m.

NEW YORK

Personal.—Dr. Harry A. Pattison, director of the Potts Memorial Institute, Livingston, N. Y., has been invited to read a paper on "Rehabilitation in the United States" at a joint meeting of the Tuberculosis Society of Scotland and the Tuberculosis Association of England and Wales on July 16. He will also attend the meeting of the National Association for the Prevention of Tuberculosis in London. Dr. Pattison will sail from New York on July 2.

Academy Adds a Section on Microbiology.—At the last meeting of the New York Academy of Medicine the request of a group of experts in the field of microbiology for the organization of the section of microbiology was approved. This, the twelfth section of the academy, will encourage the exchange of information among microbiologists and promote contacts between clinical and laboratory investigators. Dr. Gregory Shwartzman, Mount Sinai Hospital, New York, was elected chairman, and Dr. Harry Most, New York University College of Medicine, New York, secretary.

Tuberculosis in Upstate New York.—Tuberculosis in upstate New York is largely concentrated in Erie, Westchester, Monroe, Nassau, Onondaga, Albany, Oneida and Suffolk counties, which have 53 per cent of the upstate population; however, together they contribute 62 per cent of the total tuberculosis deaths, each having more than 50 per year. Thirty-eight other counties having 27 per cent of the total population contribute only 19 per cent of the total tuberculosis deaths. A study of deaths during 1944-1946 shows that out of each hundred thousand people 32 die of tuberculosis each year in the upstate area. The death rate varies in the fifty-seven counties from 10 in Yates County to 50 in Erie County. Most of the 1,980 deaths each year are among men and women in the most productive period of their lives.

New York City

Medical College Acquires Site for Expansion.—The Long Island College of Medicine, Brooklyn, on May 13 obtained title to a three block tract of land comprising 6 acres bounded by Clarkson, New York and Brooklyn avenues and Lenox Road, which tract is opposite the Kings County Hospital. An expansion program estimated to cost $5,450,000 in the initial phase is under way, and this tract will become a new campus for the medical school. The medical college, founded in 1860 as the teaching department of the Long Island College Hospital, was established in 1930 as an independent and privately operated medical school.

New York Academy of Medicine Awards.—At the Convocation of Fellowship meeting of the academy, April 24, eight Bowen-Brooks Scholarships of $500 each were presented to Drs. William Henry, New York; Joseph F. Hindman, Brooklyn; Martin H. Orens, Bellrose; Maurice S. Raben, Valhalla; Emanuel Lawrence Reichel, New York; Chauncey R. Southworth, New York; Stanley Stellar, Brooklyn, and Joseph R. Wilder, New York, all medical students. The Louis Livingston Seaman Award, given for aid and investigation in bacteriology or sanitary science, $1,000 to Professor James M. Neill, Ph.D., Cornell University Medical College, New York; $500 each to Dr. Arnold W. Pratt, New York Hospital, New York; Dr. Alwin M. Pappenheimer, New York University College of Medicine, New York, and Dr. Samuel J. Prigal, New York. The Edward N. Gibbs Memorial Prize of $1,500 was awarded to Dr. Stanley E. Bradley, assistant professor of medicine, Columbia University College of Physicians and Surgeons, New York.

Training and Research in Ophthalmology.—Extensive research is under way at the Eye Bank for Sight Restoration, Inc., with headquarters at 210 East Sixty-Fourth Street. The principal objectives are the discovery of a method for the preservation of corneal tissue over a longer time than seventy-two hours, improvement of surgical technic of corneal grafting, the use of fibrin as a substitute for sutures, and development of methods for transplanting vitreous. The eye bank has granted seven fellowships for research during the past year and sixteen scholarships for its training course on transplanting corneal tissue. Physicians from other countries who have come here on scholarships or fellowships from the eye bank include Dr. John D. Blum, Geneva, Switzerland; Dr. Walter Kornblueth of the Hebrew University, Jerusalem; Dr. Geminiano de Ocampo, Manila, instructor in eye, ear, nose and throat, Philippine General Hospital; Dr. M. K. Yue, Fukien China; Dr. P. K. Kuo, Shanghai, China, and Major M. M. A. Dubash, Bombay, India.

NORTH CAROLINA

Annual State Meeting at Virginia Beach.—The Medical Society of the State of North Carolina held its annual meeting May 12-14 at Virginia Beach, Va., under the presidency of Dr. William M. Coppridge, Durham. Out of state speakers at the general sessions were:

Dr. R. Franklin Carter, New York, Tumors of the Neck Encountered in General Surgical Practice.
Dr. Ashley W. Oughterson, New York, Strategic Planning for Control of Cancer.
Dr. J. Edwin Wood Jr., Charlottesville, Va., Significance of Renal Sodium Excretion in Congestive Heart Failure.
Dr. Raymond Hussey, Detroit, Human Relations Approach to Occupational Health.

Guest speakers at the sectional meetings Tuesday and Wednesday afternoons also included Dr. Harold W. Brown, New York, and Dr. Harry H. Ware Jr., Richmond, Va.

Professor Hollinshead Goes to Minnesota.—Dr. W. Henry Hollinshead, associate professor of anatomy, Duke University School of Medicine, Durham, has accepted the appointment of professor of anatomy, Mayo Foundation and Graduate School of Medicine, University of Minnesota, Rochester, Minn. He will organize and head a department of anatomy which is being established by the Mayo Clinic and will continue research on the peripheral nervous system and mechanisms

in the reflex control of respiration and blood pressure. Dr. Hollinshead is one of the original staff of the Duke University School of Medicine, having been a member of the department of anatomy since 1930. He will assume his new duties July 1.

PENNSYLVANIA

Dr. Essick Honored.—At a testimonial dinner June 5 in Reading the mental hygiene committee of the Council of Social Agencies of Berks County honored Dr. Charles R. Essick, vice president of the board of the Guidance Institute of Berks County. Dr. Essick's interests include recreation for the children of the city, for whom he has donated tracts of land to provide park and playground space. He has promoted the program of the Reading Tuberculosis Association, of which he has been president, and the Guidance Institute, which he helped to establish.

Fifty Year Testimonials.—At the annual meeting of the 10th Councilor District in Pittsburgh May 15 twenty-two veteran physicians were presented with fifty year testimonials: Drs. Harry A. Barnhardt, Charles I. Buvinger, William A. Caven, E. Roy Gardner, Henry M. Hall Jr., Alexander R. Hampsey, Clarence H. Ingram, Edward E. Mayer, William P. McCorkle, Alpheus McKibben, William T. Pyle and William G. Shallcross, all of Pittsburgh; Charles G. Eicher, McKees Rocks; Clarence L. Leydic, Tarentum; John B. Rugh, Pitcairn; Alfred B. Sigmann, Bridgeville; Frederic S. Kellogg, Adrian, Mich.; John R. Owens, North Canton, Ohio; Edward G. Ankney, Pleasant Unity; John A. Boale, Vandergrift; Walter Witherspoon, Derry, and Robert M. Eagleson, New Castle. Dr. Howard K. Petry, Harrisburg, president of the Medical Society of the State of Pennsylvania, presented the testimonials. At a dinner of the Cambria County Medical Society in April six physicians were honored on the completion of fifty years of service in their profession. The six physicians so honored were Drs. Charles J. Hemminger, Somerset; David H. Sangston, Uniontown; Clarence B. Millhoff, Johnstown; Milton A. Noon, Everson; Charles W. Spragg, Waynesburg, and George S. Wallace, Marianna.

Philadelphia

Plans to Expand Two Municipal Hospitals.—The city council has allocated $5,000,000 for increasing the bed capacity and providing modern facilities at Philadelphia's two municipally owned hospitals. As a part of the $20,000,000 program plan, Mayor Bernard Samuel said that 1,000 additional beds would be provided at Philadelphia General Hospital, and a new 650 bed general hospital will be erected at the Philadelphia Hospital for Contagious Diseases. Plans for Philadelphia General Hospital are divided into four stages, permitting the demolition of obsolete structures and the erection of new buildings with minimum interference. A new dormitory for student nurses and interns residence, additions and alterations to the existing receiving ward, an operating building and power plant and a separate building for 600 patients suffering with chronic chest diseases are included in the plans. The 650 bed addition to Philadelphia Hospital for Contagious Diseases will not increase the present 1,050 bed capacity but will allow part of the present hospital structure to be utilized for the new general hospital. Tuberculous patients will be moved to Philadelphia General Hospital.

TEXAS

Texas Medical Center.—The third construction job to be started in the Texas Medical Center, Houston, will get under way within the next two weeks with excavation for the new $3,500,000 Hermann Hospital. The 395 bed hospital will bring the capacity of Hermann Hospital to 695, exclusive of bassinets, as the present institution has 300 beds. The new building will be at the northern edge of the medical center and eastward from the Professional Building now under construction. The latter fourteen story building will provide office space for doctors and dentists teaching and practicing in the center. The Baylor University College of Medicine building is nearing completion and will open its doors to students in September. It is the first completed building in the twenty-five or so proposed for the medical center.

VIRGINIA

Three Counties Unite in Health District.—Effective May 1, Surry County was joined to Sussex, Prince George and Dinwiddie counties, creating the Sussex-Prince George-Dinwiddie-Surry Health District with headquarters at Stony Creek. Dr. Francis J. Clements, Stony Creek, is the health officer.

J. Shelton Horsley Memorial Lecture.—Dr. Edward D. Churchill, the John Holmans professor of surgery at Harvard Medical School, Boston, delivered the first J. Shelton Horsley Memorial Lecture April 22 in Richmond on "Historical Notes on the Management of Wounds of the Thorax." This lectureship was established by Dr. Guy W. Horsley, Richmond, in memory of his father and will be given each spring at the regular meeting of the Richmond Academy of Medicine by medical men in the fields of surgery, physiology and pathology.

Changes in Health Officers.—Dr. Walter R. Johnson, Garrisonville, assumed duties as health officer of the Alleghany-Botetourt health district, with headquarters at Covington, Va., April 1.——Dr. Merle V. Bemis, Center Conway, N. H., has been appointed health officer of the Buchanan-Tazewell health district, with headquarters at Richlands, Va.——Mr. George W. Jones Jr., formerly assistant director, hospital division, Medical College of Virginia, Richmond, has been appointed to the state department of health to assist in the indigent hospitalization program.

WASHINGTON

State Urological Society.—Nineteen urologists met in Seattle April 17 and organized the Washington State Urological Society, which will petition the Washington State Medical Association for recognition as a section under that organization at the fall state meeting. Officers elected were Drs. Frank J. Clancy president, Jack N. Nelson vice president and Harold E. Eggers Jr. secretary-treasurer, all of Seattle. Dr. William L. Ross Jr., Yakima, was designated chairman of the organization committee, which will bring in a proposed constitution and by-laws at the next meeting. The purpose of the new society is purely scientific.

Dr. Allen Inaugurated President of University.—Dr. Raymond B. Allen, acting president of the University of Washington since July 1946, was inaugurated as president at ceremonies last month. Dr. Allen received his Ph.D. degree in neurology at the University of Minnesota, 1934. He was dean of Columbia University College of Physicians and Surgeons, 1934 to 1936, and associate director, New York Postgraduate Medical School and Hospital, Columbia University, 1932 to 1936. From 1930 to 1939 he was dean of Wayne University College of Medicine, Detroit, and from September 1939 to 1943 was executive dean of the Chicago colleges of the University of Illinois; from 1943 to 1946 he was dean of the University of Illinois College of Medicine, Chicago.

WISCONSIN

Dr. Meek Elected to National Academy.—Walter J. Meek, Ph.D., professor of physiology and associate dean of the Medical School of the University of Wisconsin, has been elected to membership in the National Academy of Sciences. From 1942 to 1945, in addition to duties in the department of physiology, he served as acting dean of the medical school in the absence of the dean. His contributions in the field of physiology have been extensive, the heart and vascular system having been the primary areas of his study. In addition, he has served as chairman of the advisory board of the William Beaumont Foundation, Inc.

Course in Care of Infantile Paralysis.—The University of Wisconsin Medical School, Madison, will present an intensive course in care and treatment of infantile paralysis during the week of June 23-28 at the Medical School and State of Wisconsin General Hospital and Wisconsin Orthopedic Hospital for Children in Madison. The course is being given under the auspices of the National Foundation for Infantile Paralysis, Inc., as well as the state organizations. Enrolment will be limited to physicians from communities throughout the state, who will be selected by the local Infantile Paralysis Organizations. The diagnosis of the disease and the immediate care of the patient will be emphasized. Further information may be obtained from Dr. Llewellyn R. Cole, coordinator of graduate medical education, the University of Wisconsin Medical School, 418 North Randall Avenue, Madison 6.

MEXICO

Meningitis Epidemic.—According to the Pan American Sanitary Bureau, 59 cases of epidemic cerebrospinal meningitis were reported in the city of Monterrey, State of Nuevo Leon, from February 15 to March 29. Forty more were reported during the first twenty-three days and 19 in the following three weeks; 12 cases and one death in the city of Saltillo, Coahuila from February 23 to March 16. In San Luis Potosi, 250 miles southward, 23 cases were reported in February and 16 in March.

GENERAL

International Congress of Experimental Cytology.—This society will meet in Stockholm, Sweden, July 10-17. The Swedish organization committee has planned the congress as a series of symposiums dealing with chemical constituents of the cell, submicroscopic structure of the protoplasm (including viruses), nuclear and cytoplasmic interactions, cell metabolism and development, growth and differentiation. Secretaries of the congress are Professor T. Caspersson and Docent H. Hydén, Karolinska Institutet, Institute for Cell Research, Stockholm.

International Spanish Speaking Physicians.—At a recent meeting of the board of directors of the International Spanish Speaking Association of Physicians it was decided to hold a Latin American Congress and a short questionnaire has been sent to its members requesting their opinion on where to hold the congress and in what month and on what subjects they prefer to read papers before the congress. The president and founder of this association is Dr. Jacob M. Gershberg, New York. The general secretary is Dr. William B. P. McDonough, 161 East Eighty-First Street, New York.

Cardiovascular and Respiratory Sounds.—An album of thirteen records, twenty-six sides, designed to reproduce the heart sounds and breath sounds in health and disease has been prepared by Dr. E. H. Stokes, Sydney, Australia, and recorded by Amalgamated Wireless (Asia) Limited. Records reproduce the normal heart sounds as well as the arrhythmias, murmurs and other adventitious sounds encountered in various types of heart disease. Normal and pathologic breath sounds are reproduced in like manner. The records are of the plastic variety and are singularly free from surface noise. The sounds are described in Australian accent.

State Directors of Local Health Service.—The first postwar conference of State Directors of Local Health Services took place in Topeka, Kan., April 10-11. In attendance were representatives of twenty-two states having directors of local health services and delegates of other states. The group gave first consideration to the establishment of a basis for a permanent association, explored the possibility of district organization and blueprinted channels for more ready and profitable utilization of information on local health practice throughout the states and territories. Officers elected for the current year were Drs. Monroe F. Brown, Tennessee, president; John W. Shackelford, Oklahoma, and Vivian A. Van Volkenburgh, New York, vice presidents, and Mr. Richard F. Boyd, Illinois, secretary.

National Research Council Awards.—The National Research Council has announced the initial five awards under a $100,000 fund established by Merck & Co., Inc., to provide promising young scientists with further research training in the closely allied field of chemistry and biology. The selections made by the council from forty-nine applicants are Joseph Lein, New York, for advanced study at the California Institute of Technology on the specificity of enzymes produced by mutated and non-mutated genes in neurospora; Lorin John Mullins, Palo Alto, Calif., for advanced work at the Naples, Italy, Zoological Station on the experimental modification of permeability phenomena in marine vertebrates and invertebrates; Arthur Beck Pardee, Pasadena, Calif., for research at the University of Wisconsin in general physiology, histology, cytology and related fields as preparation for a career in medical research, and B. Roger Ray, Nampa, Idaho, for work at the Rockefeller Institute for Medical Research, New York, on the determination of movements of salts through certain nonaqueous solutions by means of high speed centrifugation.

Special Society Elections.—At the annual meeting of the American Pediatric Association in Philadelphia, May 21, Dr. William C. Menninger, Topeka, Kan., was named president-elect to succeed Dr. Winfred Overholser, Washington, D. C., who assumed the presidency. Dr. Leo H. Bartemeier, Detroit, was elected secretary and Dr. Howard W. Potter, New York, treasurer.——At the recent meeting of the National Academy of Sciences Dr. Alfred N. Richards, vice president in charge of medical affairs of the University of Pennsylvania School of Medicine, Philadelphia, was elected president. Frederick E. Wright, Ph.D., Carnegie Institution, Washington, was reelected home secretary.——At the meeting of the American Society for Pharmacology and Experimental Therapeutics, Chicago, May 18 to 22, the following officers were elected: Dr. Maurice H. Seevers, department of pharmacology, University of Michigan Medical School, Ann Arbor, Mich., president; Dr. Carl A. Dragstedt, professor of pharmacology, Northwestern University Medical School, Chicago, vice president; Dr. Harvey B. Haag, Medical College of Virginia, Richmond, secretary, and Dr. Ko Kuei Chen, Indianapolis, treasurer.

Meetings of World Health Organization Committees.—Three expert committees of the World Health Organization Interim Commission have held meetings recently, the first in Ottawa, Canada, March 10-21, when the International Committee for the Preparation of the Sixth Decennial Revision of the International Lists of Diseases and Causes of Death convened. Detailed recommendations were made for consideration by the sixth decennial conference, which is scheduled to meet in Paris in March 1948. The Subcommittee for the Revision of the Pilgrimage Clauses of the International Sanitary Conventions met in Alexandria, Egypt, April 16 and made an eight day field inspection of the Suez area, El Tor, Jidda and other points. This committee is formulating recommendations on revision of sanitary convention clauses governing health aspects of pilgrimages. The Expert Committee on Malaria convened in Geneva, Switzerland, April 21, for five days. Recommendations of that committee will be made to the World Health Organization Interim Commission and will be considered by its Committee on Epidemiology and Quarantine when it meets in the fourth session in Geneva on August 30.

Warning—Stock Swindler Among Physicians.—Hobart M. Prosser, alias Harry Moore, is being sought by the Federal Bureau of Investigation on a warrant issued for his arrest June 6, 1946 at Louisville, Ky. After inveigling physicians to buy Canadian stocks, he manages to regain possession of the stock and disappears. He is 61 years old, 5 feet 6½ inches tall, weighs 160 pounds, has brown eyes and hair and is medium stout. He has a brown mole on the back of his left hand, an irregular scar on his upper lip and another on his left temple. He has had a colostomy. His former residence is Oak Park, Ill. Any person having information which may assist in locating Prosser is requested to notify immediately the director of the Federal Bureau of Investigation, U. S. Department of Justice, Washington, D. C., or the nearest special agent in charge of the division of the Federal Bureau of Investigation.

Hobart M. Prosser, alias Harry Moore.

Marriages

EMORY ARTHUR RITTENHOUSE, McKeesport, Pa., to Miss Ellen A. Cheves of Atlanta at Fort Myer, Va., recently.

RICHARD MORRIS MOORE, Des Moines, to Miss Polly Van Zile of Evanston, Ill., in Bloomington, Ill., Dec. 21, 1946.

WALTER STAUFFER PRICE, Washington, D. C., to Miss Patricia Jean Darling of Lowell, Mass., recently.

DORN C. PITTMAN of Fairmont, N. C., to Miss Betty Mitchell of Winston-Salem February 22.

ROSCOE F. MORTON, Dumas, Ark., to Miss Mary Jane Tolliver of Carthage, Mo., February 22.

MILTON L. KROUNGOLD to Miss Betty Roseman, both of Philadelphia, Sept. 18, 1946.

ALEXANDER LEAVITT to Miss Beatrice Schiffman, both of Brooklyn, in February.

Deaths

Eben James Carey ✠ dean and professor of anatomy at Marquette University School of Medicine in Milwaukee, died June 5, aged 57, of acute infectious hepatitis. Born in Chicago July 31, 1889, Dr. Carey attended high school in Los Angeles and took his premedical work and two years of medical studies at the University of California in Berkeley-San Francisco. He graduated from Rush Medical College Chicago, in 1925, and served an internship at the Presbyterian Hospital in that city. He received the bachelor of science, master of science and doctor of science degrees from Creighton University in Omaha, where he taught for six years before coming to Marquette University in 1920. While at Marquette he was dean of medical students from 1921 to 1928, medical director of the Free Dispensary from 1924 to 1928 and chief of staff of the University Hospital from 1926 to 1928. He was commissioned a first lieutenant in the Reserve Officers' Training Corps and later became a lieutenant colonel in the National Guard of Wisconsin. He was a fellow of the American Association for the Advancement of Science and the New York Academy of Medicine, a member of the Milwaukee Academy of Medicine, serving as its president in 1939 and 1940, Chicago Institute of Medicine, the American Association of Anatomists and a former vice president of the Association of American Medical Colleges. The Radiological Society of North America awarded him a gold medal in 1933 in recognition of his x-ray study of bone growth. He was chairman of the program committee of the council on scientific work of the State Medical Society of Wisconsin, which in 1938 presented him with the Council Award. In 1931 he was chairman of the scientific exhibition of the Interstate Postgraduate Assembly in Milwaukee. During the Century of Progress in Chicago in 1933 and 1934, Dr. Carey was director in charge of medical exhibits. He was a member of the advisory committee on medical exhibits at the Texas Centennial in Dallas in 1935 and 1936, the Golden Gate International Exposition in 1939, and since 1931 had been director of medical science exhibits at the Museum of Science and Industry in Chicago. He was a member of the Council on Physical Medicine and of the advisory committee of the Scientific Exhibit of the American Medical Association. He was awarded the silver medal of the Association for an exhibit on the dynamics of origin, structure and repair of bone at the convention in Minneapolis in 1928, a citation of merit at the convention in Portland in 1929 for his exhibit illustrating a continuation of the experimental studies on bone growth, citation of merit in Detroit in 1930 and Philadelphia in 1931, in 1937 at Atlantic City, the silver medal for an exhibit on intrinsic wave mechanics of the nervous and muscular systems; and in 1942 in Atlantic City he received a gold medal for his exhibit on experimental ameboid motion of motor end plates. Dr. Carey was the author of "Studies in Anatomy" published in 1924 and of many scientific articles. More recently he gave much time to research on poliomyelitis. He was especially devoted to the advancement of medical education and to the education of the public in health.

Eben James Carey, M.D., 1889-1947

Arthur D. Knott ✠ Camilla, Ga.; born in Belton, Texas, June 27, 1876; Vanderbilt University School of Medicine, Nashville, Tenn., 1900; formerly professor of preventive medicine and hygiene at the Medical College of Virginia, Richmond; health officer of Mitchell County; for many years health officer of Wood County in Parkersburg, W. Va.; at one time health commissioner of Accomack County in Virginia; past president of the West Virginia Public Health Association and the Ashley County (Ark.) Medical Society; fellow and life member of the American Public Health Association; served during World War I; received his degree of doctor of public health from Johns Hopkins University in Baltimore; died in the Archbold Memorial Hospital in Thomasville, March 19, aged 70, of coronary occlusion.

George Hale Ryder, Quincy, Mass.; Harvard Medical School, Boston, 1919; member of the American Medical Association and the New England Ophthalmological Society; fellow of the American College of Surgeons; for many years affiliated with the Massachusetts Eye and Ear Infirmary in Boston and consulting surgeon at the Norfolk County Hospital in Braintree; consulting surgeon at Quincy City Hospital; specialist certified by the American Board of Ophthalmology; formerly on the faculty of Tufts College Medical School and Harvard Medical School; died March 12, aged 72, of coronary thrombosis.

Howard David MacFarland ✠ Utica, N. Y.; Baltimore Medical College, 1910; member of the American Urological Association; past president and for many years treasurer of the Oneida County Medical Society; member of the staff of the Faxton Hospital, where he had been president for many years; consulting physician, St. Elizabeth Hospital, Utica Memorial Hospital and the Broadacres Sanatorium; formerly health officer of Rome, where he had been on the staff of the Rome Hospital; died March 6, aged 59, of skull fracture received when he fell from a third story window.

John Morgan Settle, Charleston, S. C.; Medical College of the State of South Carolina, Charleston, 1929; member of the American Medical Association; fellow of the American College of Surgeons; associate in obstetrics and gynecology at the Medical College of the State of South Carolina; specialist certified by the American Board of Obstetrics and Gynecology; on the staffs of St. Francis Xavier Infirmary and the Baker Memorial Sanatorium; died in the Roper Hospital March 25, aged 41, as a result of burns received in December when he fell asleep while smoking.

George A. Anderson, Springville, Utah; Jefferson Medical College of Philadelphia, 1909; formerly mayor of Springville; on the staff of the Utah Valley Hospital in Provo; died March 28, aged 65, of heart disease.

Henry Watson Armistead, Indianapolis; Meharry Medical College, Nashville, 1894; died in the City Hospital March 25, aged 79, of arteriosclerosis.

Henry Grady Banister, Ila, Ga.; Emory University School of Medicine, Atlanta, 1916; member of the American Medical Association; served during World War I; died in Clearwater Beach, Fla., March 2, aged 55, of carcinoma of the lungs.

Everette Erwin Butler, Louisville, Ky.; University of Louisville Medical Department, 1918; member of the American Medical Association; on the staff of the Norton Memorial Infirmary; died in Vero Beach, Fla., March 23, aged 54, of injuries received in an automobile accident.

William Howard Cantrell, Oklahoma City; University of Oklahoma School of Medicine, Oklahoma City, 1940; member of the American Medical Association; served during World War II; died March 9, aged 32, of acute dilatation of the heart.

Salvatore Castallo ✠ Providence, R. I.; Regia Università di Napoli Facoltà di Medicina e Chirurgia, Italy, 1896; died March 18, aged 75, of cardiovascular disease.

Thomas E. Chapman, St. Paul, Va.; Kentucky University Medical Department, Louisville, 1904; served during World War I; died in Norton March 17, aged 69, of cerebral hemorrhage.

Charles Matthew Coe, St. Louis; College of Physicians and Surgeons of Chicago, 1883; died March 21, aged 88, of chronic myocarditis.

John George Dickert ✠ Englewood, N. J.; Long Island College Hospital, Brooklyn, 1893; also a graduate in pharmacy; an Affiliate Fellow of the American Medical Association; member of the Medical Society of the State of New York; fellow of the American College of Surgeons; served as consulting surgeon, Brooklyn Eye and Ear Hospital and the Bethany Deaconess Hospital, Brooklyn, where he died March 13, aged 75, of gangrenous cholecystitis.

Thomas Roche Donovan ✠ Fitchburg, Mass.; Tufts College Medical School, Boston, 1909; member of the New England Obstetrical and Gynecological Society; fellow of the American College of Surgeons; on the staff of the Burbank Hospital; died March 30, aged 64, of bronchopneumonia and arteriosclerotic heart disease.

Paul Harold Ellis ✠ Omaha; John A. Creighton Medical College, Omaha, 1899; past president of the Omaha-Douglas Counties Medical Society; died in Los Angeles March 12, aged 70, of coronary thrombosis and carcinoma of the ileum.

Edward Stanley Emery Jr., ✠ Boston; Harvard Medical School, Boston, 1920; instructor in medicine at his alma mater; specialist certified by the American Board of Internal Medicine; member of the American Gastro-Enterological Association and the American Society for Clinical Investigation; on the staff of the Peter Bent Brigham Hospital, where he died March 15, aged 52, of coronary occlusion.

Henry Wilson Fancher ✠ Thompsonville, Conn.; University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore, 1925; interned at the West Baltimore General Hospital in Baltimore and the New Britain (Conn.) General Hospital; served during World War I; on the staffs of the Springfield and Wesson hospitals in Springfield, Mass.; died March 19, aged 47, of coronary thrombosis.

John Lee Farmer ✠ Passed Assistant Surgeon, Lieutenant Commander, U. S. Navy, retired, San Diego, Calif.; Baylor University College of Medicine, Dallas, 1918; entered the U. S. Navy on Jan. 5, 1921; retired June 1, 1932 for incapacity resulting from an incident of the service; since 1942 anesthetist at the San Diego County General Hospital; died in the U. S. Naval Hospital January 10, aged 52, of cerebral hemorrhage.

Jasper Jewett Garmany, New York; Bellevue Hospital Medical College, New York, 1882; formerly clinical professor of surgery at the New York University College of Medicine; died March 26, aged 88, of heart disease.

Harrison Milton Gibson ✠ Moline, Ill.; Rush Medical College, Chicago, 1920; president of the staff of the Moline Public Hospital, where he died March 16, aged 52, of cerebral edema caused by cerebral thrombosis.

Robert Hall Glover, Philadelphia; University of the City of New York Medical Department, New York, 1894; for many years a medical missionary; since 1943 home director emeritus of the China Inland Mission; died March 23, aged 75.

Emil Hahn ✠ Cincinnati; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1905; served during World War I; on the staff of the Jewish Hospital, where he died March 8, aged 66, of carcinoma of the esophagus.

Louis Joseph Halloin, Luxemburg, Wis.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1900; died March 2, aged 79, of injuries received when struck by an automobile as he was crossing the street.

John Alexander Hunter, Cleveland; University of Wooster Medical Department, Cleveland, 1912; member of the American Medical Association and the Cleveland Academy of Medicine; an examiner for a draft board during World War II; on the staff of the Polyclinic Hospital; died March 25, aged 64, of coronary disease.

George Rheems Irwin ✠ Bridgeport, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1898; school physician; member of the police commission; Reading railroad physician; died in Norristown, Pa., March 16, aged 78, of injuries received when struck by an automobile as he was crossing the street.

Thomas Zadock Johnson, Walnut Ridge, Ark.; Memphis (Tenn.) Hospital Medical College, 1902; member of the American Medical Association; past president of the Lawrence County Medical Society; died March 1, aged 75, of cerebral hemorrhage.

Charles William Karraker ✠ Louisville, Ky.; Louisville and Hospital Medical College, 1908; past president of the board of the Kentucky Baptist Hospital, where he died March 14, aged 65, of coronary occlusion.

Jacob Meek Lanning ✠ Miami, Okla.; Memphis (Tenn.) Hospital Medical College, 1902; died March 7, aged 72.

Daniel Henry Lawler, Hammond, Ind.; University of Maryland School of Medicine, Baltimore, 1912; member of the American Medical Association; served during World War I; director of health of the public schools; died March 15, aged 59, of coronary embolism.

Raymond Vincent Lawrence ✠ Rochester, N. Y.; University of Buffalo School of Medicine, 1913; served during World War I; member of the Rochester Academy of Medicine; on the staff of St. Mary's Hospital; died March 12, aged 57, of myocarditis.

John Joseph McDermott ✠ St. Joseph, Mich.; University of Michigan Homeopathic Medical School, Ann Arbor, 1914; specialist certified by the American Board of Otolaryngology; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; served during World War I; affiliated with the Mercy Hospital in Benton Harbor and St. Joseph Sanitarium; died in the Wesley Memorial Hospital, Chicago, March 19, aged 59, of myocardial infarction.

John Roy McDowell ✠ Lakewood, Ohio; Western Reserve University Medical Department, Cleveland, 1905; specialist certified by the American Board of Radiology, Inc.; member of the Radiological Society of North America; served overseas during World War I; on the staff of the Lakewood Hospital, where he died March 10, aged 68, of coronary occlusion.

Edward C. Nast, Douglas, Wyo.; Denver and Gross College of Medicine, 1906; died in the Converse County Memorial Hospital March 24, aged 64, of myocarditis.

John Southworth Niles Sr., ✠ Carbondale, Pa.; Jefferson Medical College of Philadelphia, 1891; fellow of the American College of Surgeons; joined the staff of the Emergency Hospital, which later became the Carbondale General Hospital, where he resigned as chief of staff in 1944, a position he had held for many years; died March 21, aged 84, of coronary occlusion.

Michael A. O'Hare, Cincinnati; Miami Medical College, Cincinnati, 1905; member of the American Medical Association; died March 12, aged 68, of hypertensive heart disease.

Hiram Olsan ✠ Rochester, N. Y.; Columbia University College of Physicians and Surgeons, New York, 1909; died March 18, aged 63, of coronary occlusion.

Hovhanness Kevork Peltekian, Baltimore; Baltimore Medical College, 1893; served during the Spanish-American War and World War I; major, medical reserve corps, not on active duty; member of the Association of Military Surgeons of the United States; on the staff of the Maryland General Hospital, where he died March 8, aged 75, of coronary occlusior

J. Edward Richmond, Weirton, W. Va.; Louisville (Ky.) Medical College, 1905; member of the American Medical Association; past president of the Hancock County Medical Society; served as health officer of Hollidays Cove, physician for the state police and on the staffs of the Ohio Valley Hospital and the Gill Memorial Hospital in Steubenville; died March 13, aged 64, of coronary disease.

Albert F. Schmeling, Columbus, Wis.; Milwaukee Medical College, 1898; died in St. Mary's Hospital February 2, aged 79, of cerebral thrombosis and cerebral arteriosclerosis.

William Lord Smith, New York; Harvard Medical School, Boston, 1892; an associate of the American Museum of Natural History in New York; fellow of the Royal Geographical Society; died in the Brattleboro Retreat in Brattleboro, Vt., recently aged 83, of bronchopneumonia and cerebral arteriosclerosis.

Charles R. Vance, Bristol, Tenn.; University of Virginia Department of Medicine, Charlottesville, 1891; member of the Medical Society of Virginia and the American Medical Association; veteran of the Spanish-American War; died February 26, aged 79, of coronary thrombosis and cerebral embolus.

Morley S. Vaughn, Carleton, Mich.; Detroit College of Medicine, 1912; interned at the Jackson City Hospital in Jackson, where he served as chief physician and surgeon at the State Prison of Southern Michigan; affiliated with the Monroe (Mich.) Hospital, where he died March 15, aged 59, of chronic nephritis.

Theodore Luther Vosseler ✠ Brooklyn; Long Island College Hospital, Brooklyn, 1905; associate professor of anatomy at his alm mater; fellow of the American College of Surgeons; surgeon, Carson C. Peck Memorial Hospital; consultant, Brooklyn Eye and Ear Hospital; died March 20, aged 72, of coronary thrombosis.

Grant Bixler Weaver, Lancaster, Pa.; Hahnemann Medical College and Hospital of Philadelphia, 1906; served overseas during World War I; served as medical inspector for the U. S. Veterans Bureau; on the visiting staff of the St. Joseph's Hospital; died March 10, aged 67, of heart disease.

Foreign Letters

AUSTRALIA

(From Our Regular Correspondent)

April 1, 1947.

Free Medical Services Still a Long Way Off

The minister of health and social services in the commonwealth government said in Sydney recently that the free medical services envisaged under the referendum were from ten to fifteen years distant. Plans at the moment were almost nonexistent. The commonwealth had to face shortages of materials, equipment and personnel as well as the difficulty of agreeing on doctors' payments. The free medical services scheme called for an institute for training doctors, nurses and administrators; pathologic laboratories; x-ray, maternity, gynecologic and tuberculosis hospitals; research institutes; the manufacture, sale and distribution of medical equipment, and provision of specialist services. A vast increase in the demand for better hospitals would call for hospital administrators of a high caliber.

Director of Medical Research for Queensland

Dr. Ian M. Mackerras, one of Australia's leading entomologists, has been selected from eleven overseas and two Australian applicants as director of the new Queensland Institute of Medical Research. The purpose of the institute is to carry out research into any factor, social or economic, affecting the health of the public. A veteran of both world wars, Dr. Mackerras was responsible for much of the army's malaria control and associated entomologic and field parasitologic work. His investigations on scrub thyphus, anopheline vectors of malaria and transmission of dengue fever made possible the control of these diseases, which played such an important part in the Southwest Pacific campaign. In 1944 Dr. Mackerras was sent by the army director general of medical services to England and America to study research work being performed in the chief malaria research laboratories in those countries. He later visited Panama, West Africa and Canada to make additional studies.

An Australian Tuberculosis Association

At the fifth session of the Australian Medical Congress in Adelaide, South Australia, in 1937 tuberculosis was given special consideration. Emphasis was laid on governmental responsibility in tuberculosis control. Not that the obligations of the medical practitioner in the care of the individual patient were minimized, but his efforts were shown to be only partially effective unless allied to active and whole hearted departmental cooperation.

The idea that one tuberculosis association should be brought into being to cover the whole commonwealth originated in South Australia when the South Australian Tuberculosis Association adopted its new constitution in 1943. Among the objects was a determination to foster the formation of an Australian National Tuberculosis Association. A draft constitution for an all Australian association was submitted to a committee convened for the purpose in New South Wales. It was agreed that the Australian Tuberculosis Association should be formed and should consist of six branches, one from each state. By the agency of such a body, it was thought that propaganda could be directed to state and federal governments and that this propaganda should work for increased efforts to eradicate the disease and for the securing of adequate economic relief for sufferers and their dependents. It was also considered that steps should be taken by means of leaflets, films and radio and press publicity to form an enlightened public opinion so strong and held by such numbers of people that governments in office would be forced to take notice, since the opinion of the people who elect them to office is the only kind of opinion which influences politicians. A third advantage of the projected association would be the encouragement of the study of the disease in all its forms and relationships. Much of the setup for the association has been culled from the National Association for the Prevention of Tuberculosis in England and from the constitutions of associations in Canada and the United States. The new association will not be concerned with treatment. It will help to create conditions in which treatment can be undertaken with the greatest possible benefit to the individual patient and to the community. The ultimate aim is the increase of preventive treatment and the decrease of curative treatment until a stage is reached at which the latter will seldom need to be used.

Prevention of Silicosis with Aluminum

Although there is no evidence that the inhalation of aluminum powder affects established silicosis, the method is justified as a prophylactic under some circumstances. This was the general summary of a report by Dr. W. E. George of the Bureau of Medical Inspection, Broken Hill, New South Wales, after a visit to Canada and the United States to study the use of different types of aluminum powder in the prevention and treatment of silicosis. Dr. George reported that there was sufficient experimental evidence to justify the use of aluminum powder as a prophylactic, under strict supervision, in some circumstances. If, in an industry, the employer found that silica dust was still being inhaled by his employees after the reduction of the dust hazard to its economically practicable minimum, or if the men employed showed a susceptibility to silicosis or evidence of the progression of preexisting silicosis, they should receive aluminum inhalation treatment on a voluntary basis, provided they showed no evidence of active tuberculosis. In addition to receiving the aluminum, such men should be removed from exposure to silica dust.

Dr. George also considered that a course of prophylactic aluminum treatment could be given to men who have been exposed to dangerous quantities of silica dust within the past two years (provided tuberculosis is not present), regardless of lack of hazard in their present occupation. Also if it should become necessary to expose men to known hazardous concentrations of silica-containing dust which, because of the nature of the process, cannot be satisfactorily controlled by engineering methods, these men should receive aluminum powder by inhalation during the period they are exposed to such hazard.

However, emphasis is laid on the fact that constant supervision of the aluminum powder treatment and the recording of careful clinical observations, including periodic lung x-ray examination, are necessary if the true value of the process is eventually to be assessed. All treatment with aluminum powder should be on a voluntary basis, after its experimental nature has been explained to those whom it is proposed to treat. There is no justification at present for applying aluminum treatment to all employed in an industry unless there is definite evidence that silicosis is being produced in that industry. Aluminum inhalation should not be used indiscriminately. The best method of prevention of the development of silicosis remains the elimination of the dust hazard by controlling the liberation of dust into the atmosphere at its point of origin, and under no circumstances should the use of aluminum be permitted to lead to any relaxation in the control of silica hazards by competent engineering and medical supervision.

These conclusions seem consistent with those reached in the joint Council reports on the prevention and treatment of silicosis (THE JOURNAL, April 27, 1946, p. 1223).

Correspondence

VACCINATION AGAINST SMALLPOX

To the Editor:—In view of the nationwide problem of vaccination against smallpox which now faces this country, it is significant that a number of simple, yet very important, details are not common knowledge among the public and the medical profession.

In private practice the matter of dressings is a constant source of discussion between physician and patient or parent of the child to be vaccinated. Considerable conservation of time and avoidance of misunderstanding can be effected by placing a plain band-aid over the insert immediately after vaccination. In my experience no harm can come from such a type of dressing. This may be removed the following day, and further dressings need not be used. However, with the appearance of the vesicle (about the fourth day) daily application of 3 per cent picric acid solution in medicated ("rubbing") alcohol produces a hard, resistant vesicle. To quote the original source of this information (Ratner, Bret: Allergy, Anaphylaxis and Immunotherapy, Basic Principles and Practice, Baltimore, Williams & Wilkins Company, 1943, p. 271), "Much or all of the difficulty of the subsequent care of the vaccination can be prevented by daily application to the vesicle of a 3 per cent picric acid solution in medicated alcohol. This produces a hard, resistant vesicle. The child can be bathed throughout the period of vesiculation and pustulation. Secondary infection is minimized, no protection is needed, scarring is lessened because of the smaller degree of pustulation and finally itching is reduced. There is no interference in any way with successful vaccination. I have used this method for the past twenty years with complete satisfaction, after having read about its use by a medical army officer in some journal which reference I cannot recall. Schamberg and Kolmer (1911) also report on this method, advising the use of 4 per cent picric acid solution in 70 per cent alcohol." I have observed the formation of a hard, resistant vesicle within twelve to twenty-four hours after several applications of 3 per cent solution in medicated ("rubbing") alcohol, and the parents have unanimously praised the procedure.

Since occasional instances of postvaccinal tetanus have been reported, every effort should be made to immunize infants and children against the disease (tetanus) preceding vaccination. It is therefore pertinent that the alum precipitated toxoid can be given at intervals of three to four weeks (instead of three months) without interfering with the development of adequate immunity (to be published later). Hence the present nationwide urge toward vaccination against smallpox can be utilized to immunize against tetanus (alone or against diphtheria simultaneously by the use of diphtheria-tetanus toxoid). Obviously, the absence of immunity against tetanus should not deter the physician from vaccinating, particularly if the picric acid solution (as described) is employed.

The selection and preparation of the site for vaccination justify comment. The use of the deltoid region is safer than the lower extremity (less likelihood of infection). With the multiple pressure technic, using a very small insert, supplemented by the use of the picric acid solution in alcohol, the problem of disfiguring scars may be dismissed. The best technic is described by Ratner (see previous reference): "The skin of the upper arm in the region of the depression formed by the insertion of the deltoid muscle should be gently but thoroughly cleansed with acetone on sterile gauze or cotton and wiped or allowed to dry a few seconds. Acetone is suggested as a cleansing agent rather than alcohol for the following reasons: 1. It is a more efficient cleanser. 2. It is cheaper. 3. It is not denatured with substances which may possibly affect the vaccination result. 4. It evaporates more rapidly. 5. Approximately 200 vaccinations performed after the use of acetone and alcohol on alternate subjects resulted in more successful vaccinations with acetone than with alcohol."

Most patients or parents find it difficult to understand the course of vaccination (no immunity, partial immunity, complete immunity and unsuccessful). Verbal descriptions leave them more confused than enlightened. Consequently a colored description of the various types of take is of value. A good example may be found in Holt and McIntosh's textbook of pediatrics. I have used this for instruction in my office and have found it invaluable. It would be very helpful to have an office form describing the various types of local reaction so that parents could determine whether or not the vaccinations have pursued a proper course.

A word of caution is indicated concerning constitutional reactions to vaccination. The appearance of fever and associated complaints with the appearance of the pustule may or may not be caused by the vaccination. I can recall several instances in which constitutional complaints at the time of the pustulation were caused by other diseases (e. g. influenza bacillus meningitis, membranous tonsillitis).

It is commonly believed (at least by the public) that failure of repeated attempts at vaccination indicates immunity. Obviously this belief is an error. Sir William Osler could not be vaccinated successfully but developed smallpox following clinical exposure (see Harvey Cushing's Life of Osler).

RALPH SPAETH, M.D., Chicago.

EOSINOPHILIC GRANULOMA OF BONE

To the Editor:—In THE JOURNAL, April 26, there appeared an editorial comment on eosinophilic granuloma of bone. The statement is made "Neither have any visceral lesions been described, a curious feature inviting close study."

I wish to call attention to "Eosinophilic Granuloma of Bone—Report of a Case with Multiple Lesions of Bone and Pulmonary Infiltration" (*Arch. Int. Med.* **79**:176 [Feb.] 1947) by Albert Weinstein, Herbert C. Francis and Bertram F. Sprofkin. In this case are described lesions in the lungs which were best explained by the eosinophilic granulomatous lesion which was proved to be the nature of the bone lesions. These pulmonary changes disappeared under x-ray therapy as did the bone lesions. We feel very strongly that this is a true instance, and therefore the initially reported example, of a visceral lesion as part of the clinical picture of eosinophilic granuloma of bone.

The possible relationship of Letterer-Siwe's disease, Hand-Schüller-Christian syndrome and eosinophilic granuloma were emphasized in our report by tabulating the data presented in the review by Mallory (Medical Progress: Pathology: Disease of Bone, *New England J. Med.* **227**:995 [Dec. 10] 1942).

ALBERT WEINSTEIN, M.D., Nashville, Tenn.

To the Editor:—I wish to draw your attention to the case report by Dr. Eulyss R. Troxler and myself in the *Annals of Internal Medicine* (**25**:960 [Dec.] 1946). This is with reference to the editorial comment on eosinophilic granuloma of bone in THE JOURNAL, April 26, page 1284.

Our case demonstrates the skeletal, cerebral and pulmonary manifestations of generalized xanthomatosis. Eosinophilic granuloma represents only one phase of this generalized disease. We believe that wherever there is reticuloendothelium there can be lipoid granulomatosis. Thus the clinical symptoms produced depend on the tissues involved and the degree of involvement. Many names have been given to these various manifestations, such as eosinophilic granuloma of bone, Hand-Schüller-Christian syndrome and Letterer-Siwe disease.

DAVID NIEMETZ, M.D., Beverly Hills, Calif.

POSTGRADUATE COURSES FOR VETERAN AND CIVILIAN PHYSICIANS

Compiled by the Council on Medical Education and Hospitals for Period July 1, 1947 to Jan. 15, 1948

Medical schools, hospitals, state medical societies and other medical educational institutions and organizations are providing the Council with a growing body of information on courses designed primarily to meet the needs of returning medical officers. These have been incorporated into the lists on these pages. They are not specifically designated for veterans, since most if not all of them may also be open to interested civilian physicians. Furthermore, all courses listed which were not designed primarily for physician veterans are also open to qualified returning medical officers.

Note that each course is listed only once, without cross indexing, so that in some instances a prospective student should look under more than one heading for a desired course.

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Postgraduate Courses for Practicing Physicians—July 1, 1947 to Jan. 15, 1948

Institution	Title of Course	Schedule of Course	Registration Fee and/or Tuition
	ALLERGY		
University of California Medical School, San Francisco 22	Orientation Course in Clinical Allergy	5 days, full time, July 7-11, 1947	$40.00
Cook County Graduate School of Medicine, 427 S. Honore St., Chicago	Allergy	1 month, full time, 1st of every month	200.00
	Personal Course in Allergy	6 months, 1st of month when plans are available	125.00
	Allergy and Related Conditions	10 weeks, part time, October 8, 1947	125.00
University of Illinois College of Medicine, 1853 W. Polk St., Chicago At: Chicago Professional Colleges	Allergy	1 year, full time, September 29, 1947	Residents 300.00 Nonresidents 600.00
Wayne University College of Medicine, 1516 St. Antoine St., Detroit	Allergy Clinic and Conference	1 morning a week for 1 qtr. July 1947	per qtr. 25.00
	Allergy Clinic and Conference	1 morning a week for 1 qtr. October 1947	per qtr. 25.00
At: Receiving Hospital	Allergy Clinic and Conference	3 months, Tuesday mornings, July 1, 1947	25.00
American College of Allergists, 401 La Salle Medical Bldg., Minneapolis 2 At: University of Cincinnati College of Medicine, Cincinati, Ohio	Post Graduate Instructional Course in Allergy	1 week, November 3-8, 1947	100.00
Long Island College of Medicine and Medical Society County of Kings, 1313 Bedford Ave., Brooklyn 16 At: Beth El Hospital At: Kings County Hospital	Allergy	8 sessions, once a week, October 9, 1947	20.00
	Allergy	8 sessions, once a week, October 7, 1947	20.00
Columbia University College of Physicians and Surgeons, 630 W. 168th St., New York 32 At: Mount Sinai Hospital At: Roosevelt Hospital	Allergy	2 weeks, part time, October 20-29, 1947	40.00
	Recent Advances in Allergy	1 week, full time, November 10-15, 1947	40.00
New York Medical College, Flower and Fifth Avenue Hospitals, 20 E. 106th St., New York	Allergy	2 months, part time, arranged	50.00
New York Post-Graduate Medical School, 303 E. 20th St., New York 3	Allergy	3 weeks, full time, November 5-25, 1947	200.00
	Allergy	8 sessions, part time, January 9-February 27, 1948	25.00
American College of Allergists, 401 LaSalle Medical Bldg., Minneapolis At: Cincinnati, Ohio	Intensive Fall Graduate Instructional Course in Allergy	1 week, November 3-8, 1947	100.00
Graham-Thomas Clinic, 201 W. Franklin St., Richmond 20, Va.	Fellowship in Allergy	1 year; in selected cases 6 months July 1, 1947	None
	ANATOMY		
Indiana University School of Medicine, 1040 W. Michigan St., Indianapolis, Ind. At: St. Elizabeth Hospital, Lafayette, Ind.	Post-graduate Instruction in Anatomy	2 hours per week Monday of each week	per week 15.00
University of Maryland School of Medicine, Lombard and Greene Sts., Baltimore	General Anatomy, Review Course	Arranged, part or full time	Varies
	Surgical Anatomy	15 weeks, full time, January 1948	150.00
Wayne University College of Medicine, 1516 St. Antoine St., Detroit	Surgical Anatomy	Every Tuesday afternoon for 1 qtr., October 1947	per qtr. 20.00
University of Minnesota Medical School, Minneapolis 14 At: Center for Continuation Study	Anatomy (Dissection)	2½ months, July 1-September 15, 1947	Arranged
	Applied Anatomy for the Anesthetist	125 hours, arranged	275.00
	Applied Anatomy for the General Surgeon	250 hours, arranged	375.00
New York Medical College, Flower and Fifth Avenue Hospitals, 20 E. 106th St., New York	Applied Anatomy for the Otolaryngologist	1 month, full time, arranged	275.00
	Anatomy of the Thorax	100 hours, arranged	150.00
	Anatomy of the Urogenital System	130 hours, arranged	300.00
	Anatomy of the Abdomen	100 hours, arranged	150.00
	Anatomy for the Orthopedic Surgeon	100 laboratory hours, arranged	150.00

References will be found on page 634.

Postgraduate Courses for Practicing Physicians—July 1, 1947 to Jan. 15, 1948—Continued

Institution	Title of Course	Schools and Course	Registration Fee and/or Tuition
	ANATOMY—Continued		
New York Polyclinic Medical School and Hospital, 341-353 W. 50th St., New York	Head and Neck Dissection	6 weeks, arranged	150.00
University of North Carolina School of Medicine, Chapel Hill	Anatomy	Not given, arranged	25.00
Duke University School of Medicine, Durham, North Carolina	Anatomy	3 months or longer, full time, arranged per mo.	50.00
University of Texas Medical Branch, 912 Avenue B, Galveston	Applied Anatomy	Arranged per wk.	25.00
	ANESTHESIOLOGY		
University of Southern California School of Medicine, 1200 N. State St., Los Angeles 33 At: Los Angeles County Hospital	Anesthesia (Course 754)	12 weeks, part time, September 16, 1947	50.00
University of Illinois College of Medicine, 1853 W. Polk St., Chicago At: Research and Educational Hospital	Bronchoscopy for Anesthesiologists	1 week, full time, November 3-8, 1947	100.00
Cook County Graduate School of Medicine, 427 S. Honore St., Chicago	Inhalation Anesthesia	1 month, 1st of every month	200.00
University of Illinois College of Medicine, 912 S. Wood St., Chicago	Bronchoesophagology (Given in conjunction with Anesthesia Dept. Open to Anesthetists only) [2]	1 week, full time, November 3-8, 1947	100.00
University of Kansas School of Medicine, 39th St. and Rainbow Blvd., Kansas City 3	Refresher Course in Anesthesiology	3 days, September 9-11, 1947	15.00
Columbia University College of Physicians and Surgeons, 630 W. 168th St., New York 32 At: Mount Sinai Hospital	Anesthesia Diagnostic and Therapeutic Nerve Blocking	5 weeks, part time, October 21-November 21, 1947	50.00
New York Medical College, Flower and Fifth Avenue Hospitals, 20 E. 106th St., New York	Clinical Anesthesiology	3 months, full time, arranged	200.00
New York Polyclinic Medical School and Hospital, 341-353 W. 50th St., New York	Anesthesia	3 months, October 1, 1947-January 2, 1948	300.00
New York Post-Graduate Medical School, 303 E. 20th St., New York 3	Anesthesia	Arranged, full time Arranged, starting after September 15, 1947	125.00
New York University College of Medicine, 477 First Ave., New York 16 At: Bellevue Hospital	Anesthesiology Regional Anesthesia Regional Anesthesia	24 weeks, full time, Fall 1947 2 weeks, full time, September 2-13, 1947 2 weeks, full time, January 5-24, 1948	400.00 150.00 150.00
Duke University School of Medicine, Durham, North Carolina	Anesthesia	3 or 6 weeks, full time, arranged per mo.	50.00
	ARTHRITIS		
Long Island College of Medicine and Medical Society County of Kings, 1313 Bedford Ave., Brooklyn 16, New York At: Jewish Hospital	Arthritis	8 sessions, once a week, October 8, 1947	20.00
New York Post-Graduate Medical School, 303 E. 20th St., New York 3	Arthritis and Allied Rheumatic Disorders Arthritis and Allied Rheumatic Disorders	5 days, full time, November 10-14, 1947 8 sessions, part time, January 6-February 24, 1948	55.00 45.00
New York University College of Medicine, 477 First Ave., New York 16 At: Bellevue Hospital	Arthritis and Rheumatic Disorders	6 weeks, part time, September 29, 1947	100.00
	BACTERIOLOGY		
Wayne University College of Medicine, 1516 St. Antoine St., Detroit	Newer Bactericidal Agents Parasitology Parasitology	1 qtr., 1 afternoon a week, July 1947 1 qtr., 1 morning a week, July 1947 1 qtr., part time, October 1947	10.00 20.00 Not given
New York Medical College, Flower and Fifth Avenue Hospitals, 20 E. 106th St., New York	Parasitology Immunology Bacteriology	6 weeks, half time, arranged 6 weeks, half time, arranged 3 months, half time, arranged	75.00 50.00 100.00
New York University College of Medicine, 477 First Ave., New York 16	Bacteriology	Not given, part time Vets. Fall 1947 Non-Vets.	50.00 60.00
University of North Carolina School of Medicine, Chapel Hill	Bacteriology and Immunology	Not given, arranged	25.00
Duke University School of Medicine, Durham, North Carolina	Bacteriology and Parasitology	3 months or longer, full time, arranged per mo.	50.00
	BASIC SCIENCES		
University of California Medical School, San Francisco 22	Training Course in the Basic Sciences [3]	To be announced	To be announced
George Washington University School of Medicine, 1335 H St., N.W., Washington 5, D. C.	Basic Sciences for Physicians	8 months, part time, October 1, 1947-May 30, 1948	175.00
	Basic Sciences for Surgeons	8 months, part time, October 1, 1947-May 30, 1948	175.00
University of Illinois College of Medicine, 912 S. Wood St., Chicago	Basic Science	9 months, October 1, 1947	600.00
Indiana University School of Medicine, 1040 W. Michigan St., Indianapolis	Basic Science	6 weeks, July 7, 1947	Not given
University of Minnesota Medical School, Minneapolis 14 At: Center for Continuation Study	Basic Sciences and Their Clinical Application	10 months, full time, September 28, 1947-June 14, 1948	Arranged
New York Medical College, Flower and Fifth Avenue Hospitals, 20 E. 106th St., New York	Basic Medical Sciences	9 months, full time, October 1947 Other Surgery	600.00 800.00
University of Oklahoma School of Medicine, 800 Northeast Thirteenth St., Oklahoma City	Post Internship Educational Program in Basic Sciences Post Internship Educational Program in Basic Sciences	12 weeks, September 2-November 22, 1947 12 weeks, December 2, 1947-March 1948	None None
Baylor University College of Medicine, 509 Lincoln Ave., Houston, Tex.	Residency Training Program	6 months, full time, July 1-December 15, 1947	300.00
University of Wisconsin Medical School, 418 N. Randall Ave., Madison 6, Wis.	The Basic Sciences	Arranged sem.	148.00
Marquette University School of Medicine, 561 N. Fifteenth St., Milwaukee 3	Basic Sciences	6 months, September 1947-February 1948	150.00
	BIOCHEMISTRY		
New York University College of Medicine, 477 First Ave., New York 16	Biochemistry	Part time course Vets. Fall 1947 Non-Vets.	65.00 75.00
University of North Carolina School of Medicine, Chapel Hill, North Carolina	Biochemistry	Not given, arranged	25.00
Duke University School of Medicine, Durham, North Carolina	Biochemistry	3 months or longer, full time, arranged per mo.	50.00
	CARDIOVASCULAR DISEASES		
University of Southern California School of Medicine, 1200 N. State St., Los Angeles 33 At: Los Angeles County Hospital	Cardiology and Vascular Disease (Course 732) Cardiology (Course 733)	12 months, full time, September 15, 1947-September 15, 1948 12 weeks, part time, September 15, 1947	1,000.00 50.00

References will be found on page 634.

Postgraduate Courses for Practicing Physicians—July 1, 1947 to Jan. 15, 1948—Continued

Institution	Title of Course	Schools and Course	Registration Fee and/or Tuition
CARDIOVASCULAR DISEASES—Continued			
California Heart Association, 45 Second St., San Francisco 5 At: Los Angeles	Postgraduate Course in Cardiovascular Disease	1, 2 or 3 days, October 1947	10.00 and 15.00
Georgetown University School of Medicine, 1335 H St. N.W., Washington 5, D. C.	Postgraduate Course in Cardiology for Practitioner's	12 weeks, 1 evening a week, October 2-December 8, 1947	50.00
Cook County Graduate School of Medicine, 427 S. Honore St., Chicago	Heart Disease and Electrocardiography	11 weeks, part time, October 1, 1947	125.00
Long Island College of Medicine and Medical Society County of Kings, 1313 Bedford Ave., Brooklyn 16	Clinical Cardiology and Advanced Electrocardiography	8 sessions, twice a week, October 17, 1947	20.00
At: Israel Zion Hospital At: Jewish Hospital	Electrocardiography and Clinical Cardiology	15 sessions, twice a week, October 14, 1947	20.00
University of Buffalo School of Medicine, 24 High St., Buffalo, N. Y.	Symposium—Cardiac Diseases	3 days, part time, September 30-October 2, 1947	Not given
Columbia University College of Physicians and Surgeons, 630 W. 168th St., New York At: Bellevue Hospital	Cardio-pulmonary Physiology in Clinical Medicine (PM82)	2 weeks, full time, October 20-31, 1947	60.00
	Intermediate Cardiology (PM 61-A)	18 weeks, part time, September 23, 1947-January 20, 1948	150.00
At: Montefiore Hospital	Cardiology	40 weeks, part time, September 25, 1947-June 17, 1948	250.00
	Advanced Cardiology (PM61 B)	20 weeks, part time, January 27-June 8, 1948	250.00
At: Mount Sinai Hospital	Cardiovascular Diseases	5 weeks, part time, October 16-December 1, 1947	110.00
	Bedside Clinics in Heart Disease (PM 46)	2 weeks, part time, October 20-December 1, 1947	30.00
New York Medical College Flower and Fifth Avenue Hospitals, 20 E. 106th St., New York	Cardiology	10 weeks, part time, every 10 weeks except July and August	150.00
New York Polyclinic Medical School and Hospital, 341-353 W. 50th St., New York 19	Diagnosis and Treatment of Diseases of the Heart	3 weeks, part time, arranged	75.00
New York Post-Graduate Medical School, 303 E. 20th St., New York 3	Cardiology	5 days, full time, December 1-5, 1947	55.00
	Cardiology	8 sessions, part time, January 5-February 16, 1948	45.00
New York University College of Medicine, 477 First Ave., New York At: Beth Israel Hospital	Cardiovascular Diseases	12 weeks, part time, October 2, 1947	50.00
	A Comprehensive Postgraduate Course in Rheumatic Fever and Rheumatic Heart Disease	2 weeks, full time, July 14-25, 1947	75.00
St. Francis Sanatorium for Cardiac Children, Roslyn, N. Y.	Seminars on Rheumatic Fever and Rheumatic Heart Disease	2 months, part time, October-November 1947	20.00
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia 4 At: Philadelphia General Hospital	Cardiology	8 weeks, every Thursday, October 1947	80.00
	Cardiology	8 weeks, every Thursday, January 1948	80.00
Medical College of Virginia, Richmond	Cardiovascular Disease	2 weeks, September 1-13, 1947	Not given
CHEMISTRY			
Wayne University College of Medicine, 1516 St. Antoine St., Detroit	Physiological Chemistry Seminar	1 qtr., every Wednesday afternoon, July 1947 per qtr.	10.00
	Physiological Chemistry Seminar	1 qtr., once a week, October 1947 per qtr.	10.00
Duke University School of Medicine, Durham, North Carolina	Practical and Theoretical Instruction in Clinical Chemistry	3 months, full time, arranged per mo.	50.00
	Seminars in Clinical Chemistry	10-12 weekly seminars, part time, arranged per mo.	50.00
CHEST DISEASES			
California Tuberculosis and Health Association, 45 2nd. St., San Francisco At: Medical Schools in Los Angeles At: Various conveniently located places	Tuberculosis	3 days to 2 weeks, arranged	None
	Postgraduate—Disease of the Chest	Individually arranged	None
American Trudeau Society, 1790 Broadway, New York At: University of Colorado School of Medicine, Denver	Thoracic Diseases [2]	2 weeks, July 28-August 9, 1947	100.00
American College of Chest Physicians, 500 N. Dearborn St., Chicago At: Municipal Tuberculosis Sanitarium	Diseases of the Chest	5½ days, September 15-20, 1947	50.00
City of Chicago Municipal Tuberculosis Sanitarium, 5601 N. Pulaski Road	Postgraduate Course in Tuberculosis	Arranged, July 1, 1947-January 15, 1948	None
Cook County Graduate School of Medicine, 427 S. Honore St., Chicago	Technic of Physical Examination and Diagnosis of the Chest	8 weeks, part time, October 10, 1947	60.00
University of Kansas School of Medicine, 39th St. and Rainbow Blvd., Kansas City	Tuberculosis	4 days, October 20-23, 1947	20.00
Mississippi State Sanatorium, Sanatorium	Refresher and Postgraduate (Chest Diseases)	1 week-6 months, all year	None
Columbia University College of Physicians and Surgeons, 630 W. 168th St., New York 32 At: Bellevue Hospital	Tuberculosis and Diseases of the Chest	2 weeks, full time, October 6-18, 1947	50.00
	Cardiopulmonary Physiology in Clinical Medicine (PM 82)	2 weeks, full time, October 20-31, 1947	60.00
At: Montefiore Hospital	Diseases of the Chest	19 weeks, part time, January 2-May 14, 1948	60.00
At: Mount Sinai Hospital	Diseases of the Chest	3 weeks, part time, November 10-29, 1947	60.00
New York Medical College Flower and Fifth Avenue Hospitals, 20 E. 106th St., New York	Pulmonary Tuberculosis	1 month, arranged	150.00
Trudeau School of Tuberculosis, Saranac Lake, New York	Refresher Course in Tuberculosis	4 weeks, September 8, 1947	100.00
Medical Society of the State of New York, 428 Greenwood Place, Syracuse At: State Department of Health Tuberculosis Hospitals in various cities in the State of New York	Course of Instruction in Pulmonary Disease and Tuberculosis	3-12 months, arranged	Stipend [3]
DERMATOLOGY AND SYPHILOLOGY			
University of Southern California School of Medicine, 1200 N. State St., Los Angeles 33 At: Los Angeles County Hospital	Dermatology and Syphilology (Course 760)	11 months, full time, October 6, 1947	1,000.00

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Postgraduate Courses for Practicing Physicians—July 1, 1947 to Jan. 15, 1948—Continued

Institution	Title of Course	Schools and Course	Registration Fee and/or Tuition
DERMATOLOGY AND SYPHILOLOGY—Continued			
Cook County Graduate School of Medicine, 427 S. Honore St., Chicago	2 Weeks Clinical Course in Dermatology	2 weeks, every 2 weeks	75.00
	Course in Dermatology	12 months, when openings are available	1,000.00
	2 Weeks Course in Dermatology (Formal)	2 weeks, full time, October 20, 1947	100.00
Wayne University College of Medicine, 1516 St. Antoine St., Detroit	Dermatology Seminar	1 qtr., 1 morning a week, July 1947 per qtr.	10.00
	Dermatology Seminar	1 qtr., 1 morning a week, October 1947 per qtr.	10.00
University of Minnesota Medical School, Minneapolis 14 At: Center for Continuation Study	Pathology of Diseases of the Skin	4-6 weeks, full time, Fall 1947	Arranged
Columbia University College of Physicians and Surgeons, 630 W. 168th St., New York 32 At: Montefiore Hospital	Common Skin Diseases and Treatment (PM 68)	5 weeks, part time, October 6-November 7, 1947	40.00
New York Polyclinic Medical School and Hospital, 341-353 W. 50th St., New York 19	Dermatology and Syphilology	6 weeks, part time, 1st of any month	100.00 [4]
	Dermatology and Syphilology	3 months, part time, 1st of any month	150.00 [4]
New York Post-Graduate Medical School, 303 E. 20th St., New York 3	Dermatology and Syphilology for Pediatricians (Restricted to Pediatricians) [3]	5 days, full time, September 29-October 3, 1947	75.00
	Seminar in Practical Dermatology and Syphilology	5 days, full time, September 8-12, 1947	55.00
New York University College of Medicine, 477 First Avenue, New York At: Beth Israel Hospital	Dermatology	4 weeks, part time, October 1947	25.00
	Dermatology	4 weeks, part time, November 1947	25.00
	Dermatology	4 weeks, part time, January 1948	25.00
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia 4	Dermatology-Syphilology	8 months, full time, October 1947-May 1948	800.00
DIABETES			
New England Deaconess Hospital, 15 Deaconess Road, Boston 15	Diabetes in Relation to General Medicine	5 days, full time, October 6-11, 1947	20.00
Long Island College of Medicine, 1313 Bedford Ave., Brooklyn 16 At: Israel Zion Hospital At: Jewish Hospital	Diabetes Mellitus and Its Complications	12 sessions, once a week, October 9, 1947	20.00
	Diabetes	8 weeks, once a week, October 9, 1947	20.00
New York Post-Graduate Medical School, 303 E. 20th St., New York 3	Diabetes Mellitus, Nephritis and Hypertension	5 days, full time, October 27-31, 1947	55.00
	Diabetes Mellitus, Nephritis and Hypertension	8 sessions, part time, January 8-February 26, 1948	45.00
ELECTROCARDIOGRAPHY			
University of Southern California School of Medicine, 1200 N. State St., Los Angeles 33 At: Los Angeles County Hospital	Electrocardiography (Course 734)	12 weeks, part time, October 7, 1947	50.00
Georgetown University School of Medicine, 3900 Reservoir Road, N. W., Washington, D. C. At: Georgetown University Hospital	Practitioner's Postgraduate Course in Electrocardiography	16 weeks, part time, January 8, 1948	50.00
Michael Reese Hospital Postgraduate School, 29th St. and Ellis Ave., Chicago	Electrocardiography for Graduate Physicians	2 weeks, full time, August 18-30, 1947	150.00
University of Michigan Medical School, 1313 E. Ann St., Ann Arbor	Electrocardiographic Diagnosis	1 week, full time, November 10-15, 1947	50.00
Wayne University College of Medicine, 1516 St. Antoine St., Detroit	Electrocardiography	1 qtr., 1 morning a week, July 1947 per qtr.	10.00
	Beginning Electrocardiography	1 qtr., 1 morning a week, October 1947 per qtr.	10.00
	Advanced Electrocardiography	1 qtr., 1 afternoon a week, July 1947 per qtr.	25.00
	Advanced Electrocardiography	1 qtr., 1 afternoon a week, October 1947 per qtr.	25.00
Long Island College of Medicine and Medical Society County of Kings, 1313 Bedford Ave., Brooklyn At: Beth El Hospital At: Israel Zion Hospital	Electrocardiography and Heart Sound Recording	10 sessions, twice a week, October 7, 1947	20.00
	Clinical Cardiology and Advanced Electrocardiography	8 sessions, twice a week, October 7, 1947	20.00
At: Jewish Hospital	Electrocardiography and Clinical Cardiology	15 sessions, twice a week, October 14, 1947	20.00
Columbia University College of Physicians and Surgeons, 630 W. 168th St., New York 32 At: Mount Sinai Hospital	Intensive Course in Elementary Electrocardiography	1 week, full time, September 29-October 4, 1947	60.00
New York Medical College, Flower and Fifth Avenue Hospitals, 20 E. 106th St., New York	Electrocardiography	2 weeks, part time, October 1947	100.00
New York Polyclinic Medical School and Hospital, 341-353 W. 50th St., New York 19	Electrocardiographic Interpretation	2 weeks, part time, arranged	75.00
New York Post-Graduate Medical School, 303 E. 20th St., New York 3	Electrocardiography	5 days, full time, October 6-10, 1947	55.00
New York University College of Medicine, 477 First Ave., New York 16 At: Beth Israel Hospital	Electrocardiography	12 weeks, part time, October 2, 1947	40.00
University of Texas Medical Branch, 912 Avenue B, Galveston	Electrocardiography	3 months, once a week, October-December 1947	Not given
Medical College of Virginia, 12th and Marshall Streets, Richmond	Continuation Course in Electrocardiography	2 hours every Friday, November 1947-June 1948	5.00
ELECTROENCEPHALOGRAPHY			
University of Illinois College of Medicine, 912 S. Wood St., Chicago	Electroencephalography for Doctors	2 months, full time, arranged—probably will be started September 15, 1947	200.00
	Neuroroentgenology and Electroencephalography	12 weeks, once a week, September 30, 1947 (tentative)	20.00 [16]
Columbia University College of Physicians and Surgeons, 630 W. 168th St., New York 32	Clinical Electroencephalography	2 months, part time, October 9-December 18, 1947	60.00
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia 4 At: Graduate Hospital and Pennsylvania Institute	Electroencephalography	6 weeks, once a week, arranged	150.00
University of Texas Medical Branch, 912 Avenue B, Galveston	Electroencephalography	Arranged	Not given
ENDOCRINOLOGY			
University of Southern California School of Medicine, 1200 N. State St., Los Angeles 33 At: Los Angeles County Hospital	Graduate Endocrinology Lectures (Course 735)	12 weeks, 1 evening a week, October 8, 1947	50.00
Wayne University College of Medicine, 1516 St. Antoine St., Detroit	Endocrinology	1 qtr., part time, July 1947	Not given

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Postgraduate Courses for Practicing Physicians—July 1, 1947 to Jan. 15, 1948—Continued

Institution	Title of Course	Schools and Course	Registration Fee and/or Tuition
ENDOCRINOLOGY—Continued			
Long Island College of Medicine and Medical Society County of Kings, 1313 Bedford Ave., Brooklyn At: Beth El Hospital At: Jewish Hospital	Endocrine Diseases in Children and Adolescents	8 sessions, once a week, October 9, 1947	20.00
Columbia University College of Physicians and Surgeons, 630 W. 168th St., New York 32 At: Mount Sinai Hospital	Female Sex Endocrinology	10 sessions, once a week, October 13, 1947	20.00
	Disorders of the Endocrine System	10 sessions, twice a week, October 13, 1947	20.00
	Diseases of Metabolism	2 weeks, part time, October 27-November 8, 1947	40.00
	Endocrinological Diseases	15 days, part time, November 10-26, 1947	30.00
New York Academy of Medicine, 2 E. 103rd St., New York 29 At: Academy and Local Hospitals	Disorders of Metabolism and the Endocrine Glands	2 weeks, full time, October 6-17, 1947	5.00
New York Medical College, Flower and Fifth Avenue Hospitals, 20 E. 106th St., New York	Endocrinology	3 weeks, full time, December 1947	150.00
New York Post-Graduate Medical School, 303 E. 20th St., New York 3	Diseases of the Thyroid and Other Endocrine Glands, and Disorders of Nutrition	8 sessions, part time, January 9-February 27, 1948	45.00
	Gynecological Endocrinology	24 sessions, part time, October 2-November 29, 1947	150.00
	Gynecological Endocrinology	24 sessions, part time, January 3-26, 1948	150.00
ENDOSCOPY			
American Broncho-Esophagological Association, 700 N. Michigan Ave., Chicago At: University of Illinois College of Medicine, Research and Educational Hospital	Broncho-Esophagology and Laryngeal Surgery	2 weeks, full time, September 15-28, 1947	150.00
University of Illinois College of Medicine, 912 S. Wood St., Chicago	Special Course in Broncho-Esophagology	2 weeks, full time, November 1947 (tentative)	150.00
Columbia University College of Physicians and Surgeons, 630 E. 168th St., New York 32 At: Columbia Presbyterian Medical Center	Bronchoscopy	3 weeks, part time, October 13-31, 1947	250.00
	Gastroscopy [2]	2 months, 3 afternoons a week, not given	250.00
New York Post-Graduate Medical School, 303 E. 20th St., New York 3	Cystoscopy and Endoscopy	15 sessions, part time, September 29-October 31, 1947	75.00
	Cystoscopy and Endoscopy	15 sessions, part time, November 10-December 12, 1947	75.00
New York University College of Medicine, 477 First Avenue, New York 16 At: New York Eye and Ear Infirmary At: Beth Israel Hospital	Broncho-Esophagology [2]	12 days, full time, November 1947	250.00
	Peroral Endoscopy	16 weeks, every Monday afternoon, Fall 1947	Vets. 150.00 Non-Vets. 175.00
Temple University School of Medicine, 3400 N. Broad St., Philadelphia At: Temple University Hospital	Broncho-Esophagology	2 weeks, full time, arranged	250.00
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia 4 At: Affiliated Institutions	Bronchoesophagology, Gastroscopy and Laryngeal Surgery	2 weeks, full time, arranged	250.00
FRACTURES			
Cook County Graduate School of Medicine, 427 S. Honore St., Chicago	Special Course in Fractures	10 weeks, part time, October 9, 1947	125.00
New York Medical College, Flower and Fifth Avenue Hospitals, 20 E. 106th St., New York	Fractures and Allied Trauma	1 month, full time, Fall 1947	150.00
GASTROENTEROLOGY			
University of Southern California School of Medicine, 1200 N. State St., Los Angeles 33 At: Los Angeles County Hospital	Gastroenterology (Course 744)	12 months, full time, September 15, 1947	1,000.00
Cook County Graduate School of Medicine, 427 S. Honore St., Chicago	Personal Course in Gastroscopy and Gastroenterology	2 weeks, full time, September 22, 1947	200.00
	Gastroenterology	10 weeks, part time, September 24, 1947	100.00
Wayne University College of Medicine, 1516 St. Antoine St., Detroit	Gastroenterology	1 qtr., part time, July 1947	Not given
	Gastroenterology	1 qtr., part time, October 1947	Not given
Long Island College of Medicine and Medical Society County of Kings, 1313 Bedford Ave., Brooklyn 16 At: Beth El Hospital At: Greenpoint Hospital At: Jewish Hospital	Gastroenterology	10 sessions, twice a week, October 6, 1947	20.00
	Gastroenterology	12 sessions, twice a week, October 14, 1947	20.00
	Gastroenterology	10 sessions, once a week, October 13, 1947	20.00
Columbia University College of Physicians and Surgeons, 630 W. 168th St., New York 32 At: Montefiore Hospital	Gastroenterology	13 weeks, part time, November 4, 1947-February 17, 1948	75.00
At: Mount Sinai Hospital	Gastrointestinal Diseases	5 weeks, part time, October 6-November 12, 1947	80.00
	Surgery of the Gastro-Intestinal Tract	4 weeks, full time, October 20-November 14, 1947	150.00
	Surgery of the Gastro-Intestinal Tract	4 weeks, full time, January 5-30, 1948	150.00
New York Medical College Flower and Fifth Avenue Hospitals, 20 E. 106th St., New York	Gastroenterology	3 weeks, full time, December 1947	100.00
	Gastroscopy	2 weeks, part time, arranged	200.00
New York Polyclinic Medical School and Hospital, 341-353 W. 50th St., New York	Clinical Gastroenterology	6 weeks, October 1, 1947-January 2, 1948	50.00
New York Post-Graduate Medical School, 303 E. 20th St., New York 3	Gastroenterology	10 days, full time, October 13-24, 1947	100.00
	Gastroenterology	8 sessions, part time, January 7-February 25, 1948	45.00
New York University College of Medicine, 477 First Ave., New York 16 At: Bellevue Hospital At: Beth Israel Hospital At: Lenox Hill Hospital	Clinical Gastroenterology	20 weeks, part time, September 17, 1947	100.00
	Gastroenterology	8 weeks, part time, September 29, 1947	55.00
	Gastroenterology	7 weeks, part time, October 1, 1947	50.00
University of Oregon Medical School, Portland	Gastro-Intestinal Diseases	5 days, full time, December 1-5, 1947	50.00
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia 4 At: Graduate Hospital	Clinical Gastroenterology [2]	16 weeks, full time, arranged	400.00
GENETICS AND ANTHROPOLOGY			
Wayne University College of Medicine, 1516 St. Antoine St., Detroit	Evolution of Human Body	1 qtr., part time, October 1947	Not given
	Human Inheritance	1 qtr., part time, October 1947	Not given
	Readings in Phys. Anthropology	1 qtr., part time, October 1947	Not given
HEMATOLOGY			
University of Southern California School of Medicine, 1200 N. State St., Los Angeles 33	Hematology (Course 738)	12 weeks, part time, January 1948	50.00

References will be found on page 634.

Postgraduate Courses for Practicing Physicians—July 1, 1947 to Jan. 15, 1948—Continued

Institution	Title of Course	Schools and Course	Registration Fee and/or Tuition
HEMATOLOGY—Continued			
Cook County Graduate School of Medicine, 427 S. Honore St., Chicago	Hematology	10 weeks, part time, September 17, 1947	100.00
Wayne University College of Medicine, 1516 St. Antoine St., Detroit	Beginning Hematology	1 qtr., 1 afternoon a week, July 1947	20.00
	Beginning Hematology	1 qtr., 1 afternoon a week, October 1947	20.00
	Advanced Hematology	1 qtr., 1 afternoon a week, July 1947	20.00
	Advanced Hematology	1 qtr., 1 morning a week, October 1947	20.00
	Therapeutic Conference and Hematology Clinic	1 qtr., part time, July 1947	Not given
	Therapeutic Conference and Hematology Clinic	1 qtr., part time, October 1947	Not given
Long Island College of Medicine and Medical Society County of Kings, Brooklyn 16 At: Jewish Hospital	Clinical Hematology	8 sessions, once a week, October 16, 1947	20.00
Columbia University College of Physicians and Surgeons, 630 W. 168th St., New York 32 At: Montefiore Hospital	Advanced Hematology (PM 67)	16 weeks, part time, September 25, 1947-January 8, 1948	75.00
	Clinical Hematology	20 weeks, part time, September 16, 1947-January 27, 1948	75.00
At: Mount Sinai Hospital	Hematology	6 weeks, part time, October 23-December 6, 1947	65.00
New York Medical College, Flower and Fifth Avenue Hospitals, 20 E. 106th St., New York	Hematology	2 months, one afternoon a week, arranged	50.00
New York Post-Graduate Medical School, 303 E. 20th St., New York 3	Clinical Hematology	8 sessions, part time, January 7-February 25, 1948	30.00
New York University College of Medicine, 477 First Ave., New York 16	Hematology	6 weeks, one afternoon a week, October 1, 1947	50.00
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia 4 At: Bryn Mawr Hospital	Clinical and Laboratory Hematology	6 weeks, full time, October 1, 1947	200.00
	Clinical and Laboratory Hematology	6 weeks, full time, December 1, 1947	200.00
HOSPITAL ADMINISTRATION			
Yale University School of Medicine, 333 Cedar St., New Haven, Conn.	Hospital Administration [5]	9 months [5] September 1947-June 1948	450.00 plus fees 50.00
University of Minnesota School of Public Health, Minneapolis 14	Hospital Administration	2 years, full time, beginning September 1947	Res. 30.00 Non-Res. 75.00
Columbia University School of Public Health, 600 W. 168th St., New York 32	1. Public Health 2. Hospital Administration	1 year minimum Not given	year 490.00
INDUSTRIAL MEDICINE			
Yale University School of Medicine, 333 Cedar St., New Haven, Conn. At: Institute of Occupational Medicine	Industrial Medicine	10 weeks, part time, January-April 1948	Nominal
MALIGNANT DISEASES			
Colorado State Medical Society; Colorado Division, American Cancer Society; Rocky Mountain Cancer Foundation At: Shirley-Savoy Hotel, Denver	Rocky Mountain Cancer Conference	2 days, full time, July 9-10, 1947	None
University of Kansas School of Medicine, 39th St. and Rainbow Blvd., Kansas City 3	Radiology and Cancer	3 days, January 19-21, 1948	15.00
National Cancer Institute, U. S. Public Health Service, Bethesda, Md. At: Various Institutions Throughout Country	Diagnosis and Treatment of Cancer (Traineeship) [6]	May be appointed at any time	None [7]
University of Buffalo School of Medicine, 24 High St., Buffalo, N. Y.	Symposium—Cancer	3 days, part time, September 30-October 2, 1947	Not given
Cornell University Medical College, 1300 York Ave., New York	Cytologic Diagnosis of Cancer	2 weeks, September 8-20, 1947	100.00
University of Oregon Medical School, 3181 S.W. Marquam Hill Road, Portland 1	Diagnosis and Treatment of Malignant Growths	4 days, full time, September 22-25, 1947	25.00
Tennessee State Medical Association, Postgraduate Committee, 4 University Center Building, Memphis At: County seat towns and centers	Cancer Instruction, With Emphasis Upon Diagnosis. For the General Medical Profession	10 weeks, [8] 1947-1948	10.00
Tennessee State Medical Association, 510 Doctors Building, Nashville At: Various cities in Tennessee (5)	Post-Graduate Instruction in Cancer	10 lectures, once a week	10.00
State Medical Society of Wisconsin, 917 Tenney Building, Madison 3	Five Diagnostic Teaching Clinics on Cancer	1 week, July 9-15, 1947	None
MEDICINE, GENERAL			
Medical College of Alabama, 620 S. 20th St., Birmingham 5 At: Birmingham	Medicine, Surgery, Gynecology and Obstetrics	3 days, full time, October 1947 (tentative)	None
At: Mobile	Medicine, Surgery, Gynecology and Obstetrics	3 days, full time, October 1947 (tentative)	None
Sage Memorial Hospital, Ganado, Ariz.	Harlow Brooks Memorial Navajo Clinical Conference	3 days, August 25-27, 1947	Not given
California Medical Association, 450 Sutter St., San Francisco At: Leading cities in California	Postgraduate Program	All year	None
College of Medical Evangelists, Boyle and Michigan Ave., Los Angeles	Basic Sciences in Internal Medicine	33 weeks, full time, October 1, 1947-June 11, 1948	500.00 plus nominal fees
University of Southern California School of Medicine, 1200 N. State St., Los Angeles 33	Internal Medicine (Course 730)	12 weeks, full time, September 15, 1947	250.00
	Internal Medicine (Course 730)	12 weeks, full time, January 5, 1948	250.00
	Internal Medicine Course (Course 731) [9]	9 months, full time, January 5, 1948	750.00
At: Los Angeles County Hospital	Recent Advances in Diagnosis and Treatment (Course 743)	12 weeks, part time, September 18, 1947	50.00
	Quantitative Methods in Medicine (Course 770)	12 weeks, part time, September 1947	50.00
University of California Medical School, San Francisco 22 At: Medical Center	Course in Internal Medicine	12 weeks, every Monday evening, September 22-December 8, 1947	40.00
	Applications of Nuclear Physics to the Biological and Medical Sciences [10]	3 weeks, full time, June 30-July 18, 1947	250.00
		Lectures only	100.00
San Joaquin County Medical Society, Stockton, Calif.	Refresher Course — Stockton Postgraduate Study Club	7 sessions, September-December 1947	10.00
Connecticut State Medical Society, 258 Church St., New Haven, Conn., and Yale University School of Medicine, 333 Cedar St., New Haven, Conn.	Connecticut Clinical Congress	3 days, full time, September 1947	members 3.00 non-members 5.00

References will be found on page 634.

Postgraduate Courses for Practicing Physicians—July 1, 1947 to Jan. 15, 1948—Continued

Institution	Title of Course	School and Course	Registration Fee and/or Tuition
GENERAL MEDICINE—Continued			
Georgetown University School of Medicine, 3900 Reservoir Rd., N.W., Washington, D. C. At: Georgetown University Hospital	Recent Advances in General Medicine	30 sessions, Thursday afternoons, October 16, 1947	75.00
The Medical Society of the District of Columbia, 1718 M St., N.W., Washington	18th Annual Scientific Assembly	3 days, October 6-8, 1947	members None guests 5.00
Emory University School of Medicine, 50 Armstrong St., Atlanta, Ga. At: Grady Memorial and Emory University Hospitals	General Internal Medicine	Arranged, full time	per qtr. 125.00 per week 12.00
University of Georgia School of Medicine, University Place, Augusta	Postgraduate Course for Colored Physicians	5 days, June 30-July 4, 1947	None
Cook County Graduate School of Medicine, 427 S. Honore St., Chicago	2 weeks Course in Internal Medicine	2 weeks, full time, October 6, 1947	75.00
Illinois State Medical Society, 30 N. Michigan Ave., Chicago At: Throughout State of Illinois	Postgraduate Conferences (12) on Diversified Medical Topics	1 day each conference, next fiscal year 1947-1948	None
The Institute of Medicine of Chicago, 86 E. Randolph St., Chicago	Where We Stand Today in Medicine	Twice a month, beginning September 12, 1947	None
Indiana Board of the General Practice of Medicine, Inc., Lafayette, Ind. At: Medical Center, Indianapolis	Graduate Training in the General Practice of Medicine	8 months, once a month, September 1947-June 1948	None
Indiana University School of Medicine, 1040 W. Michigan St., Indianapolis 7 At: Indiana University Medical Center At: St. Elizabeth Hospital, Lafayette	Refresher Course for General Practitioners	1 week, October 1947	Not given
	Postgraduate Extension Course in Medicine	Monthly (3 hours), first Tuesday of each month	None
Mississippi Valley Medical Society, Quincy, Illinois At: Burlington, Iowa	Practical Papers for General Practitioners	3 days, full time, October 1-3, 1947	None
State University of Iowa School of Medicine, Iowa City At: Charles City	Internal Medicine and Obstetrics and Gynecology	1 day, arranged	None
At: Decorah	Internal Medicine, Surgery and Dermatology	2 days, arranged	None
At: Estherville	Internal Medicine and Dermatology	1 day, arranged	None
At: Iowa City	Medicine General	5 days, full time, July 28-August 1, 1947	None
	Medicine General	5 days, full time, August 25-29, 1947	None
	Medicine General	5 days, full time, September 22-26, 1947	None
	Medicine General	5 days, full time, October 27-31, 1947	None
	Medicine General	5 days, full time, November 24-28, 1947	None
	Informal Refresher Course	Arranged, full time	None
At: Red Oak	Internal Medicine and Obstetrics and Gynecology	1 day, full time, arranged	None
Kentucky State Medical Association, 620 S. Third St., Louisville 2 At: University of Louisville School of Medicine	Refresher Course in Medicine	6 weeks, continuously	None
Massachusetts Medical Society, 8 The Fenway, Boston At: Copley Plaza Hotel	New England Postgraduate Assembly	3 days, October 29-31, 1947	regis. 3.00
At: Throughout Massachusetts	Postgraduate Extension Course	8 months, October 1947-May 1948	None
University of Michigan Medical School, Wayne University College of Medicine, Michigan Dept. of Health and Michigan State Medical Society, Ann Arbor	Practitioners' Course	2 days, Fall 1947	None
At: Battle Creek-Kalamazoo	Practitioners' Course	2 days, Fall 1947	None
At: Bay City	Practitioners' Course	2 days, Fall 1947	None
Wayne University College of Medicine, 1516 St. Antoine St., Detroit	Diagnostic Conference	1 qtr., once a week, July 1947	per qtr. 10.00
	Diagnostic Conference	1 qtr., one morning a week, October 1947	per qtr. 10.00
	Graduate Conference	1 qtr., part time, July 1947	Not given
	Graduate Conference	1 qtr., part time, October 1947	Not given
	Medical Seminar	1 qtr., part time, July 1947	Not given
	Medical Seminar	1 qtr., part time, October 1947	Not given
University of Michigan Medical School, Wayne University College of Medicine, Michigan Dept. of Health, Michigan State Medical Soc. At: Flint	Practitioners' Course	2 days, Fall 1947	None
At: Grand Rapids	Practitioners' Course	2 days, Fall 1947	None
At: Houghton	Practitioners' Course	2 days, Fall 1947	None
At: Ironwood	Practitioners' Course	2 days, Fall 1947	None
At: Jackson-Lansing	Practitioners' Course	2 days, Fall 1947	None
At: Marquette	Practitioners' Course	2 days, Fall 1947	None
At: Powers	Practitioners' Course	2 days, Fall 1947	None
At: Saginaw	Practitioners' Course	2 days, Fall 1947	None
At: Traverse City	Practitioners' Course	2 days, Fall 1947	None
At: Upper Peninsula	Practitioners' Course	2 days, Fall 1947	None
American Congress of Physical Medicine, 30 N. Michigan Ave., Chicago 2 At: Hotel Radisson, Minneapolis	Instruction Seminar	4 days, September 2-5, 1947	a lecture 2.00 10 lectures 15.00
Kansas City Southwest Clinical Society, 630 Shukert Bldg., Kansas City, Mo.	Annual Fall Clinical Conference	4 days, full time, October 6-9, 1947	15.00
Interstate Postgraduate Medical Association, 16 N. Carroll St., Madison, Wis. At: St. Louis, Mo.	International Medical Assembly—A Postgraduate School	4 days, full time, October 14-17, 1947	regis. 5.00
Omaha Mid-West Clinical Society, Omaha, Neb. At: Hotel Paxton	Fifteenth Annual Assembly	5 days, October 27-31, 1947	regis. 5.00
University of Nebraska College of Medicine, 42nd St. & Dewey Ave., Omaha	General Refresher Course	44 hours per week, September, October, November, December 1947	25.00
Rutgers University and State University of New Jersey, New Brunswick, N. J. At: Camden	Postgraduate Medical "Rutgers Plan"	3 years; 2 half days each week, beginning July 1947	per qtr. 24.00
Long Island College of Medicine, Medical Society of County of Kings, 1313 Bedford Ave., Brooklyn 16 At: Greenpoint Hospital	Manikin	12 sessions, once a week, October 14, 1947	20.00
At: Jewish Hospital	Sterility [2]	12 sessions, once a week, October 7, 1947	20.00
	Peripheral Vascular Diseases	8 sessions, twice a week, October 7, 1947	20.00
	Hypertension and Nephritis	8 sessions, once a week, October 15, 1947	20.00
	Symposium—Body Proteins	3 days, September 25-27, 1947	Not given
	For General Practitioners	2 weeks, September 9-20, 1947	60.00
University of Buffalo School of Medicine, 24 High St., Buffalo, N. Y.	Peripheral Vascular Diseases	4 months, part time, September 25, 1947-January 22, 1948	75.00
Columbia University College of Physicians and Surgeons, 630 W. 168th St., New York 32 At: Montefiore Hospital	Geriatrics	4 months, part time, October 7, 1947-February 3, 1948	65.00
At: Mount Sinai Hospital	Diseases of the Kidneys	4 days, part time, October 13-16, 1947	15.00
	Diseases of the Liver	10 days, part time, October 6-15, 1947	35.00
	Peripheral Vascular Diseases	3 months, part time, October 7, 1947-January 6, 1948	40.00
	Symposium on Internal Medicine	8 weeks, full time, October 6-December 6, 1947	350.00

References will be found on page 634.

Postgraduate Courses for Practicing Physicians—July 1, 1947 to Jan. 15, 1948—Continued

Institution	Title of Course	School and Course	Registration Fee and/or Tuition
MEDICINE, GENERAL—Continued			
American College of Surgeons, 40 E. Erie St., Chicago	Thirty-Third Clinical Congress	5 days, September 8-12, 1947	5.00 [11]
At: New York			Non-Mem. 10.00
Cornell University Medical College, 1300 York Ave., New York 21	Graduate Course in Internal Medicine	6 months, full time, continuously, 1st of each month	6 months 300.00
At: Bellevue Hospital			2 weeks 50.00
New York Medical College Flower and Fifth Avenue Hospitals, 20 E. 106th St., New York	Internal Medicine	1 month, full time, monthly except July and August	150.00
	Peripheral Vascular Disease	2 weeks, Fall semester	200.00
New York Polyclinic Medical School and Hospital, 341-353 W. 50th St., New York	Course for General Practitioners	6 weeks, arranged	100.00 [4]
	Course for General Practitioners	3 months, arranged	200.00 [4]
New York Post-Graduate Medical School, 303 E. 20th St., New York 3	Diseases of the Liver, Biliary Tract and Pancreas—Introductory Course	6 sessions, part time, November 12-Dec. 17, 1947	60.00
	Diseases of the Liver and Biliary Tract	8 sessions, part time, January 7-February 25, 1948	30.00
	Peripheral Vascular Diseases	8 sessions, part time, January 6-February 24, 1948	30.00
	Psychological Aspects of Internal Medicine	8 sessions, part time, January 9-February 27, 1948	25.00
	Review of Internal Medicine	13 weeks, full time, September 23-December 13, 1947	400.00
	Seminar in Internal Medicine	2 months, full time, January 5-February 27, 1947	300.00
New York University College of Medicine, 477 First Ave., New York 16	Internal Medicine	12 weeks, part time, September 29, 1947	12 weeks 150.00 8 weeks 100.00 4 weeks 50.00
At: Bellevue Hospital	Internal Medicine	4 weeks, part time, Fall 1947	75.00
At: Beth Israel Hospital	General Review for General Practitioners	8 weeks, full time, Fall 1947	Vets. 125.00 Non-Vets. 150.00
At: Lenox Hill Hospital	University Postgraduate Course in Clinical Medicine	8 weeks, once a week, Fall 1947	Not given
University of North Carolina School of Medicine, Chapel Hill	University Postgraduate Course in Clinical Medicine	8 weeks, once a week, Fall 1947	Not given
At: Various towns in North Carolina			
Duke University School of Medicine, Durham, N. C.	General Medicine	1-2 weeks or longer, full time, arranged	per month 50.00
	Medicine	3 months or longer, full time, arranged	per month 50.00
American College of Surgeons, 40 E. Erie St., Chicago	Thirty-Second Clinical Congress	5 days, December 16-20, 1947	Fellows None Non-Mem. 10.00
At: Cleveland Public Auditorium, Cleveland, O.			
Oklahoma City Clinical Society, 512 Medical Arts Bldg., Oklahoma City	Oklahoma City Clinical Society Annual Fall Clinical Conference	4 days, October 27-30, 1947	15.00 [12]
At: Biltmore Hotel			
Medical Society of State of Pennsylvania, Pittsburgh	Refresher Course for Practitioners [13]	5 weeks, once a week, Fall 1947	50.00
At: Allentown			
At: Johnstown	Refresher Course for Practitioners [13]	5 weeks, once a week, Fall 1947	50.00
At: Oil City	Refresher Course for Practitioners [13]	5 weeks, once a week, Fall 1947	50.00
At: Wilkes-Barre	Refresher Course for Practitioners [13]	5 weeks, once a week, Fall 1947	50.00
At: Williamsport	Refresher Course for Practitioners [13]	5 weeks, once a week, Fall 1947	50.00
University of Oregon Medical School, 3181 S.W. Marquam Hill Road, Portland 1	General Informal Review	Arranged	per month 75.00
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia 4	Internal Medicine (Basic Studies)	8 months, full time, October 1947-May 1948	800.00
At: Graduate Hospital	Segmental Neuralgias, Relief by Regional Anesthesias	3 weeks, full time, monthly, October 1947-May 1948	200.00
Piedmont Postgraduate Clinical Assembly, 209 N. Main St., Anderson, S. C.	Piedmont Postgraduate Clinical Assembly	1 day (including night) September 15, 1947	5.00
Alumni Association, Medical College of the State of South Carolina, 16 Lucas St., Charleston	Alumni Post-Graduate Seminar	3 days, full time, November 4-6, 1947	15.00
Vanderbilt University School of Medicine, Nashville 4, Tenn.	Medicine	1-3 months, October 1947	3 months 166.66
Southwestern Medical College of Southwestern Medical Foundation, 2211 Oak Lawn, Dallas, Tex.	Postgraduate Course in Medicine in Preparation for Specialty Board Examination	46 weeks, part time, September 1947-June 1948	10.00
University of Texas Medical Branch, 912 Avenue B., Galveston	General Internal Medicine	1 week, to be announced	25.00
	Tumor Symposia	1 qtr., September 13, 1947	Not given
	Quarterly Tumor Conference	1 day, December 1947	5.00
University of Vermont College of Medicine, Pearl St., College Park, Burlington	General Practice	12 weeks, part time, July 1947-January 1948	per year 500.00 or pro rated
	General Practice; Internal Medicine; Surgery	1-9 months, 1st of any month, July 1947-January 1948	per year 500.00 or pro rated
	Internal Medicine	4 weeks minimum, part time, July 1947-January 1948	per year 500.00 or pro rated
Graham-Thomas Clinic, 201 W. Franklin St., Richmond, Va.	Clinical and Didactic	12 months, full time, July 1, 1947	None
	Clinical and Didactic	12 months, full time, January 1, 1948	None
Washington State Medical Association, Seattle	Internal Medicine	4 weeks, September 1-27, 1947	Not given
Jackson Clinic, 16 S. Henry St., Madison, Wis.	Post-Graduate Clinics (Series of bi-monthly programs from ½ to 1 day each)	First Friday morning in month	None
At: Methodist Hospital			
State Medical Society of Wisconsin, 917 Tenney Bldg., Madison 3	Postgraduate General Clinics (Surgery, Obstetrics and Internal Medicine)	3 days, August 6-8, 1947	6.00 or per day 7.00 [14]
At: Three cities in Western and Northern Wisconsin			
University of Wisconsin Medical School, 418 N. Randall St., Madison	Course for Specialists in Internal Medicine [2]	2-6 months, arranged	per month 100.00
At: Wisconsin General Hospital	Observation Course in Medical and Clinical Subjects	1-5 months, arranged	per month 100.00
NEUROLOGY AND PSYCHIATRY			
University of Southern California School of Medicine, 1200 N. State St., Los Angeles 33	Electrodiagnosis and Electromyography (Course 778)	4 weeks, full time, August 4, 1947	100.00
At: Los Angeles County Hospital	Psychosomatic Medicine (Course 742)	12 weeks, once a week, January 1948	50.00
University of California Medical School, San Francisco 22	Postgraduate Course in Psychiatry	12 weeks, full time, September 8-November 28, 1947	200.00
	Psychiatry and Neurology	3 months, September 1947	200.00
American College of Physicians, 4200 Pine St. Philadelphia	Psychosomatic Medicine	2 weeks, September 15-27, 1947	Not given
At: Colorado Psychopathic Hospital, Denver			

References will be found on page 634.

Postgraduate Courses for Practicing Physicians—July 1, 1947 to Jan. 15, 1948—Continued

Institution	Title of Course	School and Course	Registration Fee and/or Tuition
NEUROLOGY AND PSYCHIATRY—Continued			
Catholic University of America, Dept. of Psychology and Psychiatry, Washington, D. C. At: St. Elizabeth's Hospital	Psychiatric Conferences	2 semesters, September 1947	per year 20.00
	Group Psychotherapy	2 semesters, September 1947	per sem. 20.00
	Individual Psychotherapy	2 semesters, September 1947	per sem. 20.00
Catholic University of America, Dept. of Psychology and Psychiatry, Washington, D. C.	Psychiatry — Case Seminar in Psychotherapy	2 semesters, September 1947	per sem. 20.00
	Introduction to Psychiatry	1 semester, September 1947	10.00
	Clinical Psychiatry	2 semesters, September 1947	per sem. 20.00
	Psychopathology	2 semesters, September 1947	per sem. 10.00
	Neurology, Neuropathology and Neuroroentgenology	2 semesters, September 1947	per sem. 20.00
	Seminar in Clinical Psychology and Psychotherapy	1 semester, September 1947	20.00
St. Elizabeth's Hospital, Washington, D. C.	Postgraduate Courses in Psychiatry and Neurology	10 months, part time, October 19, 1947-August 1948	None
Cook County Graduate School of Medicine, 427 S. Honore St., Chicago	Clinical Neurology for the General Practitioner	10 weeks, part time, October 1, 1947	80.00
Institute for Psychoanalysis, 664 N. Michigan Ave., Chicago	Fundamentals of Psychodynamics	Every Friday, October 4-December 20, 1947	15.00
At: Cook County Psychopathic Hospital	Psychiatric Case Demonstrations	Every Monday, September 30-December 23, 1947	10.00 [15]
At: Illinois Neuropsychiatric Institute	Psychosomatic Case Demonstrations	5 weeks, once a week, October 8-December 17, 1947	None
At: Michael Reese Hospital	Psychopathological Case Demonstrations	Every Monday, October 6, 1947	None
University of Illinois College of Medicine, 912 S. Wood St., Chicago 12	Basic Psychiatry (1)	12 weeks, once a week, September 30, 1947 (tentative)	20.00 [16]
	Basic Psychiatry (2)	12 weeks, once a week, September 30, 1947 (tentative)	20.00 [16]
	Neuroanatomy	12 weeks, once a week, September 30, 1947 (tentative)	20.00 [16]
	Neuroroentgenology and Electroencephalography	12 weeks, once a week, September 30, 1947 (tentative)	20.00 [16]
	Review Course in Basic Neurology and Psychiatry	12 weeks, once a week, September 30 1947 (tentative)	120.00 [16]
	Neuropathology	12 weeks, once a week, September 30, 1947 (tentative)	20.00 [16]
	Neurophysiology	12 weeks, once a week, September 30, 1947 (tentative)	20.00 [16]
University of Kansas School of Medicine, 39th and Rainbow Blvd., Kansas City	Psychosomatic Medicine	Arranged, late Fall 1947	Not given
At: State of Kansas Circuit	Psychosomatic Medicine	1½ days each area, September 1947	5.00
The Topeka Institute for Psychoanalysis, 3617 W. Sixth Ave., Topeka, Kan. At: Menninger Clinic	Psychoanalytic Literature [17]	14 seminars, every 2 weeks, July 8, 1947-January 6, 1948	42.00
	Basic Concepts of Psychoanalysis [17] (3 seminars)	2 weeks, once a week, July 7-21, 1947	9.00
	Psychoanalysis and Anthropology [17] (6 seminars)	Once every 2 weeks, July 1-September 9, 1947	18.00
	Psychoanalytic Contributions to the Theory and Treatment of Psychoses [17] (10 seminars)	Once a week, September 8-November 10, 1947	22.50
	Psychoanalytic Technique Part I [17] (3 seminars)	Once a week, November 17-December 1, 1947	9.00
	Continuous Case Seminar [17] (29 seminars)	Once a week, July 3, 1947-January 15, 1948	87.00
Wayne University College of Medicine, 1516 St. Antoine St., Detroit	Orthopsychiatry and Pediatrics	1 qtr., part time, July 1947	Not given
	Orthopsychiatry and Pediatrics	1 qtr., part time, October 1947	Not given
	Clinical Neurology	1 qtr., part time, July 1947	Not given
	Clinical Neurology	1 qtr., part time, October 1947	Not given
	Clinical Psychiatry Seminar	1 qtr., part time, July 1947	Not given
	Clinical Psychology Seminar	1 qtr., part time, October 1947	Not given
	Neuropathology	1 qtr., part time, October 1947	Not given
	Psychology—Infant and Child	1 qtr., part time, July 1947	Not given
	Psychology—Infant and Child	1 qtr., part time, October 1947	Not given
University of Minnesota Medical School, Minneapolis 14	Psychosomatic Medicine	2 weeks, arranged	Arranged
Long Island College of Medicine and Medical Society County of Kings, 1313 Bedford Ave., Brooklyn 16 At: Jewish Sanitarium and Hospital for Chronic Diseases	Clinical Neurology and Neuropathology	8 sessions, once a week, October 3, 1947	20.00
At: Jewish Hospital	Child Psychiatry	10 sessions, once a week, October 7, 1947	20.00
American Institute for Psychoanalysis, 266 West End Ave., New York 23	Theory of Neurosis	15 weeks, September 1947	30.00
	Seminar on Dreams [18]	10 weeks, February 1948	20.00
	The Analytic Process [18]	15 weeks, September 1947	30.00
	Introductory Lectures on Psychoanalytic Technique	5 sessions, September 1947	10.00
	Continuous Case Seminar [18]	10 sessions, September 1947	20.00
	Neuroses and Psychoses	15 sessions, September 1947	15.00
	Readings and Psychoanalysis, Part II Reading in Freud	20 sessions, September 1947	40.00
At: New School for Social Research	Introduction to the Rorschach Method of Personality Diagnosis	10 lectures, 5 seminars, September 1947	17.50
	Literary Figures in the Light of Modern Psychoanalysis	15 weeks, February 1948	20.00

1. Special contract to War Department.
2. Specialists only.
3. Stipends up to a maximum of $250.00 per month are available if certain qualifications can be met.
4. Half fee to physicians in service.
5. Followed by 12 months in hospital administrative internship.
6. Training given in various institutions throughout country. Applicant must make his own arrangement with institution.
7. Stipend paid on per diem basis.
8. In each teaching district—covering the state in 2 years.
9. Pre-requisite—Course 730.
10. Evening seminars to be announced during course.
11. Fellows and Jr. candidates.
12. Including dinners and luncheons.
13. Write for schedule to: Committee on Graduate Education, 230 State St., Harrisburg, Pa.
14. Includes meals.
15. Free to physicians on active duty at Cook County Psychopathic Hospital.
16. Full-time employees of the Illinois Department of Public Welfare pay no fee.
17. Restricted to physician candidates of the Topeka Institute for Psychoanalysis.
18. Candidates in training only.

(To be concluded next week)

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and the Examining Boards in Specialties were published in THE JOURNAL, June 7, page 556.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: Montgomery, June 24-26. Sec., Dr. D. G. Gill, 519 Dexter Ave., Montgomery 4.

ARIZONA: * *Examination.* Phoenix, July 1-2. Sec., Dr. J. H. Patterson, 826 Security Bldg., Phoenix.

CALIFORNIA: *Written.* San Francisco, July 7-10. *Oral.* San Francisco, July 19-20. *Oral Clinical Examination for Foreign Medical Graduates.* San Francisco, June 21. Sec., Dr. Frederick N. Scatena, 1020 N. St., Sacramento 14.

COLORADO: * Denver, July 18. Final date for filing application is June 15. Sec., Dr. J. B. Davis, 831 Republic Bldg., Denver.

CONNECTICUT: *Examination.* Hartford, July 8-9. Secretary to the Board, Dr. Creighton Barker, 258 Church St., New Haven. *Homeopathic.* Derby, July 8. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: *Examination.* Dover, July 8-10. *Endorsement.* Dover, July 15. Sec., Medical Council of Delaware, Dr. J. S. McDaniel, 229 S. State St., Dover.

FLORIDA: * *Examination.* Jacksonville, June 24-25. Sec., Dr. Harold D. Van Schaick, 2736 S. W. Seventh Ave., Miami 36.

GEORGIA: Atlanta, Oct. 14-16. Sec., Mr. R. C. Coleman, 111 State Capitol, Atlanta 3.

HAWAII: *Examination.* Honolulu, July 8-11. Sec., Dr. S. E. Doolittle, 881 S. Hotel St., Honolulu 53.

IDAHO: Boise, July 14-16. Sec., Bureau of Occupational Licenses, Dr. S. M. Poindexter, Eastman Bldg., Boise.

ILLINOIS: Chicago, June 24-26. Sec., Mr. Philip M. Harman, Supt. of Registration, State House, Springfield.

INDIANA: *Examination.* Indianapolis, June 17-19. Exec. Sec., Board of Medical Registration and Examination, Miss Ruth V. Kirk, 416 K. of P. Bldg., Indianapolis.

KANSAS: *Endorsement.* Kansas City, June 26. Sec., Board of Medical Registration and Examination, Dr. J. F. Hassig, 905 N. Seventh St., Kansas City 10.

KENTUCKY: *Examination.* Louisville, Sept. 22-24. Sec., State Board of Health, Dr. P. E. Blackerby, 620 S. Third St., Louisville 2.

MAINE: Augusta, July 1-2. Sec., Board of Registration in Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Medical Examination.* Baltimore, June 17-20. Sec., Dr. E. H. Kloman, 1215 Cathedral St., Baltimore.

MASSACHUSETTS: *Examination.* Boston, July 8-11. Sec., Board of Registration in Medicine, Dr. H. Q. Gallupe, 413 E State House, Boston.

MICHIGAN: * Semi-Annual meeting, Lansing, June 24. Sec., Board of Registration in Medicine, Dr. J. E. McIntyre, 100 W. Allegan St., Lansing 8.

MINNESOTA: * *Examination.* Minneapolis, June 17-19. Sec., Dr. J. F. Dulbois, 230 Lowry Medical Arts Bldg., St. Paul 2.

MISSISSIPPI: Jackson, June 23-24. Asst. Sec., State Board of Health, Dr. R. N. Whitfield, Jackson 113.

MONTANA: Helena, Oct. 6-8. Sec., Dr. Otto G. Klein, 302 N. Main St., Helena.

NEBRASKA: * *Examination.* Omaha, June. Dir., Bureau of Examining Boards, Mr. Oscar F. Humble, State Capitol Bldg., Lincoln.

NEW HAMPSHIRE: *Examination.* Concord, Sept. 11-12. Sec., Board of Registration in Medicine, Dr. John S. Wheeler, 107 State House, Concord.

NEW JERSEY: *Examination.* Trenton, June 17-18. Sec., Dr. E. S. Hallinger, 28 W. State St., Trenton.

NEW YORK: *Examination.* Albany, Buffalo, New York and Syracuse, June 23-26. Sec., Dr. Jacob L. Lochner Jr., State Education Bldg., Albany.

NORTH CAROLINA: *Endorsement.* Raleigh, June 24. *Examination.* Raleigh, June 25-26. Acting Sec., Mrs. L. McNeill, 226 Hillsboro St., Raleigh.

NORTH DAKOTA: Grand Forks, July 1-4. Sec., Dr. G. M. Williamson, 4½ S. Third St., Grand Forks.

OHIO: *Examination.* Columbus, June 17-20. Sec., Dr. H. M. Platter, 21 W. Broad St., Columbus.

OREGON: * *Examination.* Portland, July 23-25. Applications must be on file on or before July 9. Sec., Miss Lorienne M. Conlee, 608 Failing Bldg., Portland.

RHODE ISLAND: * *Examination.* Providence, June 19-20. Chief, Division of Professional Regulation, Mr. Thomas B. Casey, 366 State Office Bldg., Providence.

SOUTH CAROLINA: Columbia, June 23-25. Sec., Dr. N. B. Heyward, 1329 Blanding St., Columbia.

SOUTH DAKOTA: * Pierre, July 15-16. Sec., Medical Licensure, State Board of Health, Dr. Gilbert Cottam, Capitol Bldg., Pierre.

UTAH: Examinations are held in June of every year. Asst. Dir., Department of Registration, Miss Rena B. Loomis, 324 State Capitol Bldg., Salt Lake City 1.

VIRGINIA: Richmond, June 18-21. Sec., Dr. K. D. Graves, 306 Medical Arts Bldg., 30½ Franklin Rd., Roanoke.

WEST VIRGINIA: *Examination.* Charleston, June 30, July 1-2. Commissioner, Public Health Council, Dr. Newman H. Dyer, State Capitol, Charleston 5.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ARIZONA: June 17. Sec., Mr. Francis A. Roy, Science Hall, University of Arizona, Tucson.

DISTRICT OF COLUMBIA: *Examination.* Washington, Oct. 20-21. Sec., Commission on Licensure, Dr. G. C. Ruhland, 6012 E. Municipal Bldg., Washington.

IOWA: Des Moines, July 8. Sec., Dr. Ben H. Peterson, Coe College, Cedar Rapids.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Workmen's Compensation Acts: Compensability of Injury from Mercury Bichloride Poisoning.—The claimant filed a petition for disability compensation alleged to be due to him for injuries resulting from mercury bichloride poisoning contracted during the course of his employment. From an award in favor of the claimant, the defendant employer and insurer appealed to the Supreme Court of Florida.

Of the 9th, 10th and 11th of August 1943 claimant was directed by his employer to wash the interior of a building with a solution of bichloride of mercury. He had been a painter for many years but had had no previous experience with, or knowledge of the dangerous nature of, the mercury solution. The only warning given was not to get the solution in his mouth. The building in which he worked was not ventilated, the weather was hot and mosquito bites were plentiful. Conditions were favorable for poisonous fumes to penetrate his body and blood stream. On the 20th claimant complained to the foreman on the job and requested relief under the workmen's compensation law but the foreman rejected the claim because claimant had suffered no accident. In December following, claimant's teeth became loose, his gums became red and swollen, his fingers and finger nails turned brown. From all appearances he was a very sick man. Soon thereafter the doctors diagnosed his ailment as nephritis or "Bright's disease," caused by the absorption of bichloride of mercury.

The question which claimed the most attention, said the court, was whether or not the injury was caused by an accident as contemplated by the workmen's compensation act. The point was made that claimant did not use the poisonous solution through an accident. This is not important. Neither, continued the court, will recovery be precluded because reputable medical testimony was introduced to show that the ill effects would have appeared sooner if the injury had been caused by the mercury poisoning. The commission found that the workman was enclosed without ventilation in hot weather, causing the pores of his skin to open; mosquitoes punctured his skin. He was a strong and well man before then. The period of time for the poison to react would naturally depend somewhat on the degree of physical resistance of the individual, as well as on the peculiar conditions surrounding the exposure.

It was urged that the element of time, place and cause must be clearly proved, but evidence was abundantly clear, said the court, that the cause of claimant's ailment was mercury poisoning, absorbed in the Link Trainer building on August 9th, 10th and 11th, 1943. It is objected that claimant was unable to identify some event which preceded the injury. The event, said the court, was the sudden entry of the poisonous fumes into his body. The injury followed. The victim had no way to recognize the event. None of the five senses will detect the fumes of mercury poison. In fact, the court pointed out, the damage to the blood stream and kidneys is painless, the victim's first knowledge being when and after the injury has been done.

We are satisfied, concluded the court, that this judgment rests on an inference of liability which is sustained by the facts, namely: Claimant was well immediately preceding the 9th, 10th and 11th of August. He was sick soon after. During those three days he was exposed to a highly dangerous solution which undoubtedly would cause the kind of illness of which he soon became a sufferer. The evidence showed a natural sequence of events based on facts from which liability could be inferred. The judgment in favor of the claimant was affirmed.—*Meehan v. Crowder, 28 So. (2d) 435 (Fla., 1946).*

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1937 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied with stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Diseases of Children, Chicago

73:257-390 (March) 1947

*Pathogenesis of Passive Rh Isosensitization in Newborn (Erythroblastosis Fetalis). Ruth R. Darrow and Josephine Chapin.—p. 257.
Pathogenesis of Mongolism. T. H. Ingalls.—p. 279.
Blood Pressure of Normal Girls from 3 to 16 Years of Age. M. Elizabeth Downing.—p. 293.
*Alexander's Rabbit Serum in Treatment of Influenzal Meningitis: Evaluation of Its Use in Conjunction with Sulfonamide Compounds. K. H. Beck and F. R. Janney.—p. 317.
*Xanthoma Tuberosum, Aortic Stenosis, Coronary Sclerosis and Angina Pectoris: Report of Case in Boy 13 Years of Age. C. D. Cook, H. L. Smith, C. W. Giesen and G. L. Berdez.—p. 326.
Pyloric Stenosis in Twins: Review of Literature and Report of Case. J. H. Laubscher and A. M. Smith.—p. 334.

Pathogenesis of Passive Rh Isosensitization.—According to Darrow and Chapin, analysis of cases of erythroblastosis fetalis not only corroborates Levine's theory of isoimmunization but supports also the concept of sensitization of the anaphylactic type. These two states, both based on antigen-antibody relationships, appear to be present to varying extents but are not necessarily parallel in occurrence or severity. This produces the extreme variety of symptoms. The passive isoimmune reaction is presumed to take place between the specifically modified (maternal) globulin and the baby's Rh-positive erythrocytes, resulting in their destruction. The reversed, passive isosensitization reaction, on the other hand, would be expected to occur within the tissue cells, principally those of the liver, between the specific sensitizing antibody and the Rh antigen freed by the destruction of the Rh-positive erythrocytes. This intracellular reaction produces injury to the cell, causing histamine and other cellular constituents having toxic effects to be released into the circulation. These substances, in turn, have a damaging effect on susceptible tissues elsewhere in the body.

Alexander's Rabbit Serum for Influenzal Meningitis.—Beck and Janney review observations on patients with influenzal meningitis who were admitted to the Milwaukee Children's Hospital from January 1939 to April 1946, which is the span of time since Alexander's serum has been available and sulfonamide compounds have been given in massive dosages. Previous to this time only 3 of 66 patients with proved influenzal meningitis had survived. Of 45 patients treated during the period when Alexander's serum was available, 24 died and 21 recovered, but 9 of 24 fatalities occurred within the first twenty-seven hours after hospitalization and thus cannot be considered in judging the efficacy of immune rabbit serum in combination with sulfonamide drugs. Of 22 patients who were treated adequately according to Alexander's standards, 19 recovered and 3 died. Of 9 patients treated with sulfonamide drugs and without serum therapy, 2 lived and 7 died. Diagnosis of influenzal meningitis must be made early in order to combat it effectively with rabbit serum and sulfonamide drugs. The sulfonamides must be given in high concentrations and by intravenous or subcutaneous routes. Serum should be preceded by intravenous fluids so that the free floating type-specific carbohydrate of the organism is eliminated from the blood stream and the dehydration alleviated. Alexander's anti-influenzal rabbit serum (administered according to her recommendations) combined with sulfonamide drugs is 85 per cent efficient in cases in which therapy is instituted before the patient is moribund. To date it is the only efficient method for treating meningitis due to Hemophilus influenzae type B.

Xanthoma Tuberosum and Heart Disease.—Cook and his co-workers report the occurrence of xanthoma tuberosum, a typical history of angina pectoris and significant changes in the electrocardiogram in a boy aged 13 years. A review of the literature revealed 20 cases of xanthoma tuberosum with definite or probable cardiac involvement among patients 23 years of age or less at the time the cardiac lesion developed. In 3 of these cases angina pectoris was present. The cardiac lesions in the cases were due to xanthomatous infiltration of the aortic valve and coronary arteries. This hypothesis is substantiated by necropsy in similar cases.

American Journal of Medical Sciences, Philadelphia

213:257-384 (March) 1947

*Studies on Malignant Hepatitis. G. Alsted.—p. 257.
Diagnosis of Acute Respiratory Tract Infections. J. E. Ziegler Jr., E. C. Curnen, G. S. Mirick and F. L. Horsfall Jr.—p. 268.
Changing Concept of Myeloma of Bone. E. Aegerter and R. Robbins.—p. 282.
*Disseminated Calcification of Pancreas: Subacute and Chronic Pancreatitis. C. W. Wirts Jr. and W. J. Snape.—p. 290.
*Experiences with Penicillin and Dicumarol in Treatment of Subacute Bacterial Endocarditis. C. J. Thill and O. O. Meyer.—p. 300.
*Treatment of Acute Diphtheria and Chronic Carrier State with Penicillin. L. Weinstein.—p. 308.
Effects of Blockade of Autonomic Ganglia in Man with Tetraethylammonium: Preliminary Observations on Its Clinical Application. R. H. Lyons, G. K. Moe, Rosalie B. Neligh and others.—p. 315.
Insensitivity to Epinephrine in Patient with Functioning Tumor of Adrenal Medulla. R. L. Mayock and E. Rose.—p. 324.
Increased Reactivity Caused by Adrenalin. E. E. Cameron.—p. 331.
Thiamine Circulation Time. A. Ruskin and G. M. Decherd Jr.—p. 337.
Electrocardiographic Changes Caused by Hyperventilation. D. Scherf and M. Schlachman.—p. 342.
Injectional Treatment of Internal Hemorrhoids. R. Turell.—p. 350.
Complications of Mumps. J. Humphries.—p. 354.
Further Report on Use of Bismuth Sodium Tartrate Intravenously in Treatment of 203 Additional Patients with Tularemia. W. W. Jackson.—p. 358.
Flea versus Rat Control in Human Plague. J. E. Gordon and P. T. Knies.—p. 362.

Malignant Hepatitis.—Alsted says that in Denmark acute hepatitis has run a course parallel to that in the rest of the world. During the last four years the disease has been from seven to eight times as frequent as it was in the prewar period. In 1944 and 1945 a considerable number of patients developed a malignant form of hepatitis. This form occurs chiefly in women over 45 years of age and has a fatality rate of 50 per cent. Most frequently its duration is from four to nine months, but both a much more acute and a more protracted course may be observed. The clinical features are jaundice, frequent febrile attacks of pain and symptoms of portal stasis. As to prognosis, the result of Takata's test is important, whereas the remaining liver function tests are of only secondary value. The lesions are characterized by destruction of the liver tissue and in the more chronic cases by the development of a cicatrized connective tissue. The etiology is obscure. The disease differs from acute infectious hepatitis both etiologically and clinically. The treatment has until now been entirely symptomatic.

Disseminated Calcification of Pancreas.—Wirts and Snape direct attention to the least frequently recognized form of pancreatic lithiasis, known variously as disseminated calcification of the pancreas, pancreatitis petrificans and diffuse parenchymal calcification of the pancreas. They add 2 cases to those existing in the literature. The patients complain chiefly of abdominal pain, which is most frequently present in the epigastrium, going through to the back, but which may also radiate to the right or left hypochondriac regions, the pelvis or either shoulder. The possibility of disseminated calcification of the pancreas should be considered in any patient with a long history of upper abdominal pain. Diagnosis is made on (1) a plane film of the abdomen including that area between the first and fourth lumbar vertebrae, (2) stool examination for total fat and creatorrhea and (3) the pancreatic function test. Recognition of this disease may prevent the needless removal of a gallbladder, appendix or kidney. The clinician should always be on guard to rule out disease of the pancreas when deep seated pain in the epigastrium is associated with mental symptoms. Remaining alert to the possibility of the existence of disseminated calcification of the pancreas is probably the most important single factor in its recognition.

Penicillin and Dicumarol in Bacterial Endocarditis.—Of the 22 patients with subacute bacterial endocarditis reviewed by Thill and Meyer, 13 received both penicillin and dicumarol, and 9 were given only penicillin. Treatment with penicillin alone or combined with dicumarol should be persistent for a minimum of six weeks. This prolonged therapy has given decidedly better results than anything previously employed. Although their results favor combined therapy, the authors remain skeptical that anticoagulant therapy offers advantages. Anticoagulant therapy carries with it grave hazards.

Penicillin for Acute Diphtheria and the Chronic Carrier.—Weinstein reports the effect of penicillin on the clinical course and bacterial flora of the nose and throat in acute cases of diphtheria and on the value of the drug in the chronic diphtheria carrier state. Penicillin has no effect on the clinical course of diphtheria. Its use does not eliminate the necessity of administering adequate amounts of antitoxin. Penicillin reduces the duration of both the convalescent and chronic diphtheria carrier states. A dose of at least 120,000 and preferably 240,000 units of penicillin daily for twelve days is recommended for the treatment of acute diphtheria. A minimum of 240,000 units of penicillin a day for twelve days is suggested for the treatment of the chronic diphtheria carrier state.

American Journal of Medicine, New York

2:229-326 (March) 1947

*Streptomycin Treatment of Urinary Tract Infections, with Special Reference to Use of Alkali. H. W. Harris, R. Murray, T. F. Paine, L. Kilham and M. Finland.—p. 229.
Dienestrol: Another Synthetic Estrogen of Clinical Value. Stella H. Sikkema and E. L. Sevringhaus.—p. 251.
Bacillus Pyocyaneus Infections: Review, Report of Cases and Discussion of Newer Therapy, Including Streptomycin. M. M. Stanley.—p. 253.
Rheumatic Heart Disease in Adult. C. Eggleston.—p. 278.
Treatment of Acute Rheumatic Fever and Acute Rheumatic Heart Disease. L. M. Taran.—p. 285.
Permanent Heart Block Following German Measles. D. Goldfinger, W. Schreiber and P. H. Wosika.—p. 320.

Streptomycin with Alkali in Urinary Infections.—Harris and his associates report the effects of streptomycin in 21 cases of protracted urinary tract infections in which other treatments had either failed or seemed inadvisable. The results obtained suggest that the maintenance of an alkaline reaction of the urine throughout the period of streptomycin therapy increases the efficacy of the streptomycin and reduces the likelihood of the development of streptomycin fastness in the infecting organisms.

American Journal of Ophthalmology, Cincinnati

30:257-396 (March) 1947

Influence of Hypersensitivity on Endogenous Uveal Disease. A. C. Woods.—p. 257.
Contribution to Knowledge of Ocular Siderosis and Posterior Degenerative Pannus: Part I of Research in Industrial Ophthalmology. A. Loewenstein and J. Foster.—p. 275.
Accommodative Astigmatism. J. M. O'Brien and R. E. Bannon.—p. 289.
Involvement of Orbit in Chronic Inflammation of Frontal Sinus. M. C. Benford and H. Brunner.—p. 297.
Observations on 300 Consecutive Cases of Ocular War Injuries. J. G. Bellows.—p. 309.

American Journal of Pathology, Ann Arbor, Mich.

23:173-326 (March) 1947

Pathology of High Altitude Frostbite. N. B. Friedman and R. A. Kritzler.—p. 173.
Tuberous Sclerosis with Congenital Tumors of Heart and Kidney: Report of Case in Premature Infant. H. R. Pratt-Thomas.—p. 189.
Pathogenesis of Polycystic Livers: Reconstructions of Cystic Elements in 2 Cases. R. F. Norris and R. M. Tyson.—p. 201.
Histologic Study of Reaction in Hamster Spleen Produced by Virus of Colorado Tick Fever. W. C. Black, L. Florio and M. O. Stewart.—p. 217.
Blindness in Ducks Accompanying Hypoglycemia: Clinical and Pathologic Study. R. H. Rigdon and D. E. Fletcher.—p. 227.
Plasmacytoma of Stomach: Report of Case. H. Schwander, J. Estes and W. G. Cooper.—p. 237.
Fate of Carcinoma Emboli in Lung. O. Saphir.—p. 245.
Permeability of Renal Glomeruli of Several Mammalian Species to Labeled Proteins. H. Smetana.—p. 255.
Intralobular Regeneration of Liver Cells in Man. C. T. Ashworth and H. C. Reid.—p. 269.
Giant Cell Tumor of Bone: Critical Survey. E. E. Aegerter.—p. 283.
Residual Tissue Changes in Male Dogs Following Cessation of Orally Administered Stilbestrol. R. M. Mulligan and D. L. Becker.—p. 299.
Studies on Motor Cells of Spinal Cord: V. Poliomyelitic Lesions of Spinal Motor Nuclei in Acute Cases. H. C. Elliott.—p. 313.

American Journal of Psychiatry, New York

103:433-576 (Jan.) 1947

Alumni Appraisal of Psychiatric Education. W. C. Porter and H. A. Davidson.—p. 440.
Psychiatry in Medical Education: Teacher Characteristics and Qualifications. J. C. Whitehorn.—p. 446.
What Should Be Taught. N. D. C. Lewis.—p. 450.
Genetics of Epilepsy. W. G. Lennox.—p. 457.
Neuropsychiatric Program of Veterans Administration. D. Blain and J. H. Baird.—p. 463.
Care and Treatment of Psychiatric Patient in Veterans Administration. H. J. Tompkins and A. W. Snedeker.—p. 467.
Neuropsychiatric Training Program of Veterans Administration. Florence Powdermaker.—p. 470.
New Role of Psychologic Testing in Psychiatry. K. Menninger, D. Rapaport and R. Schafer.—p. 473.
Psychoanalytic Approach to Masculine and Feminine Principles in Music. Margaret Tilly.—p. 477.
Dilantin Treatment for Behavior Problem Children with Abnormal Electroencephalograms. Charlotte F. Walker and Barbara B. Kirkpatrick.—p. 484.
Racial Aspects of Emotional Problems of Negro Soldiers. R. B. Stevens.—p. 493.
Mental Illness Among Negro Troops Overseas. H. S. Ripley and S. Wolf.—p. 499.

Am. J. Roentgenol. & Rad. Therapy, Springfield, Ill.

57:145-280 (Feb.) 1947

Edison and Roentgenology. A. W. Fuchs.—p. 145.
Trend Toward Cancer Specialization. W. E. Costolow.—p. 157.
*Cancer of Eyelid Treated by Radiation, with Consideration of Irradiation Cataract. H. B. Hunt.—p. 160.
*Cancer of Tongue. G. S. Sharp and H. D. Spickerman.—p. 181.
Carcinoma of Anus. O. N. Meland.—p. 199.
*Pulmonary Complications of Dorsal Sympathectomy. R. C. Pendergrass and F. F. Allbritten Jr.—p. 205.
Webs and Constricting Bands in Upper Esophagus (Sideropenic Dysphagia). M. A. Thomas.—p. 213.
Carcinoma of Pancreas with Generalized Bone Metastases: Report of 2 Cases. M. J. Geyman and A. J. Present.—p. 220.
Sickle Cell Anemia: Case Report with Unusual Roentgen Findings. E. Kraft and G. Bertel.—p. 224.
Anterior Vertebral Wedging—Frequency and Significance. G. H. Fletcher.—p. 232.
Solitary Myeloma of Bone. S. D. Blum.—p. 239.
Recognition and Significance of Bacteriogenic Gas in Soft Tissues. R. L. Nichols and C. L. Hinkel.—p. 245.

Radiation in Cancer of Eyelid.—The survey presented by Hunt is based on 100 patients selected from 134 seen from 1930 to 1946. Carcinoma of the eyelid is a disease of the elder age group, three fourths of the patients being past 60 years of age. Men are slightly more susceptible than women. Four fifths of the lesions are located along the lower lid or about the inner canthus. Basal cell carcinomas represent three fourths of the neoplasms of the eyelid, and these lesions usually show slow growth. Squamous cell carcinoma of the eyelid, although not common, is a more serious lesion, shows greater local invasion and frequently metastasizes to the parotid or submaxillary glands. Cancer of the eyelid can be as effectively controlled by fractionated roentgen therapy as by surface radium. Careful fulguration is the treatment of choice in the removal of benign moles and papillomas. Surgical ablation of large elevated carcinomas of the eyelid prior to roentgen therapy permits more effective treatment of their base with less mass irradiation of the eyeball and other adjacent nondiseased tissues by both primary and scattered rays. Four of the hundred cases reviewed have ended fatally from cancer of the eyelid during the past fifteen years. Therapeutic failures result from advanced and inaccessible disease, impairment of the tumor bed by prior inadequate therapy, insufficient or uneven dosage, incomplete marginal coverage of lesion, and inadequate follow-up of patients. Superficial roentgen therapy is effective in eradication of cancer of the eyelid with maximal preservation of the uninvolved tissues and with minimal injury to the eye when properly protected by an eyeshield.

Cancer of Tongue.—Sharp and Spickerman present a flexible plan for the eradication of the primary lesion as well as of metastatic cervical involvement in cancer of the tongue. The incidence of lingual carcinoma can be drastically reduced by early recognition and treatment of precancerous lesions. The relation between the site of the primary lesion, the etiology and the degree of malignancy is pointed out. Definite diagnosis of the character of a lesion is possible only on the basis of biopsy

and pathologic examination. No ill effects from biopsy were observed in this series. Through medication with penicillin and the sulfonamide drug infection of the primary lesion and resultant dissemination of cancerous cells have largely been eliminated. The primary lesion is treated exclusively by irradiation, roentgen therapy being combined with subsequent implantation of radium needles. By using a short target-skin distance, the daily dose has been increased while the total dose has been considerably lowered; thus, the course of roentgen treatments has been reduced to ten or twelve days. For interstitial radium therapy platinum needles have been employed almost exclusively. In the treatment of metastatic cervical nodes, preoperative roentgen therapy is combined with subsequent radical neck dissection. When surgery is contraindicated, administration of a larger dose of x-rays is immediately followed by implantation of radium needles. An unselected, consecutive series of 81 cases is reviewed. The described course of treatments led to five year cures in 31.3 per cent of all cases.

Pulmonary Complications of Dorsal Sympathectomy.—Pendergrass and Allbritten review the anatomy and surgical procedure of dorsal sympathectomy. Extrapleural hemothorax, pneumothorax, pleural effusion, atelectasis and mediastinal emphysema are the most frequent complications of dorsal sympathectomy. Extrapleural hemothorax is the most serious. Aspiration should be carried out early. Six cases are reviewed. Routine x-ray examinations of the chest should be made within a few days after dorsal sympathectomy.

American Journal of Surgery, New York

73:311-420 (March) 1947

Posterior Colpotomy for Diagnosis of Pelvic Disease. A. Decker.—p. 313.
Primary Cyst of Round Ligament. M. A. Castallo and B. J. Giletto. —p. 320.
*Tissue Cultures as Clinical Aid in Diagnosis of Malignant Tumors. E. J. Grace.—p. 326.
Recurrent Dislocation of Patella. F. R. Thompson and D. M. Bosworth. —p. 335.
Common Errors in Burn Treatment. H. L. Romence.—p. 340.
*Streptomycin Therapy for Bacteremia. E. J. Pulaski and W. H. Amspacher.—p. 347.
Pyriform Syndrome in Relation to Sciatic Pain. D. R. Robinson. —p. 355.
Hydrogen Ion Concentration (*p*H) of Vagina Associated with Ectropion of Cervix (Cervicitis). K. J. Karnaky.—p. 359.
Significance of Hyperuricemia in Surgery: Introduction to Current Observations. B. J. Ficarra.—p. 363.
End Results of Ruptured Intervertebral Disks in Industry. A. P. Aitken and C. H. Bradford.—p. 365.

Tissue Culture in Malignant Tumors.—Grace maintains that tumor cells can be more readily identified by tissue culture than by section. Malignant cells can proliferate from a single cell. This does not take place in normal tissue. This fact may point the way to earlier diagnosis. Increase in activity of tumor cell growth is related to the degree of malignancy. The author has graded tumors into four classes, according to their degree of malignancy. Tissue culture methods have been used to differentiate nodules of Hodgkin's disease from other lymphomas. This procedure should be universally used in the difficult diagnosis of Hodgkin's disease. Tumors with differentiated cells have less tendency to metastasis than those with undifferentiated cells. High activity of cells in tissue culture gives warning of danger.

Streptomycin Therapy for Bacteria.—Pulaski and Amspacher summarize experiences in U. S. Army hospitals with streptomycin therapy in bacteremias due to gram-negative bacilli and gram-positive cocci. The majority of patients received 1 Gm. or more of streptomycin in divided, intramuscular doses, and treatment was continued for an average period of fourteen days. Twenty-two of 24 patients recovered and 2 died. Beneficial results attributable to streptomycin was noted in 18 of the 22 who recovered, while in 4 others the streptomycin was of questionable value. One patient died shortly after the initial dose of streptomycin was given. The other death was of a patient with rapidly progressive fulminating staphylococcic pyemia. Death occurred on the tenth day of therapy. Necropsy confirmed widespread abscess formation and also revealed an acute ulcerative endocarditis. In the 18 cases in which administration of streptomycin was considered beneficial, best results were obtained when the suppurating lesion was amenable to and had the benefit of surgical drainage. Streptomycin therapy in bacteremia can be expected to be successful if the organisms are susceptible in vitro, if the dosage is adequate, if the interval between doses provides bacteriostatic blood levels and the duration of treatment is long enough, if surgical drainage of the primary focus is prompt and exact and if due consideration is given to management of the patient as a whole.

Am. J. Syphilis, Gonorrhea and Ven. Dis., St. Louis

31:101-238 (March) 1947

Transmission of Experimental Syphilis from Mouse to Mouse—Absence of Spirocheta Pallida and of Pathologic Changes in Presence of Successful Inoculation. U. J. Wile.—p. 109.
Six to Twelve Month Follow-Up Results in Early Syphilis Treated by a Twenty Day Intensive Arsenobismuth System. D. M. Pillsbury and A. B. Loveman.—p. 115.
Treatment of Early Syphilis by the Twenty-Six Week Mapharsan-Bismuth Schedule. T. H. Sternberg and W. Leifer.—p. 124.
*Reactions to Twenty Day Intensive Therapy with Mapharsen and Bismuth for Syphilis, with a Note on Use of BAL in Their Management. F. E. Cormia and S. G. Blauner.—p. 135.
Dichlorophenarsine Hydrochloride in Treatment of Syphilis. H. Beerman and V. S. Wammock—p. 150.
Treatment of Paroxysmal Hemoglobinuria with Penicillin: Report of Case. L. C. Goldberg.—p. 163.
Clinical, Radiologic and Pathologic Aspects of Late Pulmonary Syphilis —Effects of Penicillin Therapy. G. V. Kulchar and F. Windholz. —p. 166.
Proposed Clerical System for a City Venereal Disease Control Program. H. Pariser.—p. 181.
Present Status of Immunity and Allergy in Syphilis. E. Urbach and H. Beerman.—p. 192.
Weltmann Serum Coagulation Reaction in Syphilis. J. L. Callaway, with technical assistance of Louise W. Adams.—p. 216.
Nonspecific Serologic Tests for Syphilis. L. W. Shaffer.—p. 221.
Practical Aspects of Verification Tests for Syphilis in Office Practice. S. W. Becker.—p. 225.
Problem of Positive Serologic Tests for Syphilis in Lupus Erythematosus, with Report of 3 Cases. C. J. White.—p. 235.

Twenty Day Intensive Therapy with Mapharsen and Bismuth.—Cormia and Blauner review observations in 500 cases of syphilis treated with moderate daily doses of mapharsen over a twenty day period. Mapharsen was given daily for twenty days in a unit dosage of 1 mg. per kilogram of body weight daily with the individual daily dose limited to a maximum of 75 mg. Bismuth subsalicylate in a unit dosage of 0.2 Gm. was administered concurrently at intervals of three days, with a total of eight injections in a period of twenty-two days. The prescribed treatment was completed in 476, or over 95 per cent, of the 500 patients. Types of reactions encountered in the 24 patients in whom the treatment had to be terminated were cerebral irritation, jaundice, toxic erythema, agranulocytosis, severe fever, hemorrhagic encephalitis and persistent albuminuria. Reactions of sufficient severity to interrupt therapy were encountered in 190 patients. BAL, or 2,3-dimercaptopropanol, was administered to 18 patients in 2 cc. ampules by intramuscular injection. The small number of patients treated and the variable plan of therapy do not permit the drawing of definite conclusions regarding the effectiveness of BAL.

American Review of Tuberculosis, New York

55:1-108 (Jan.) 1947

Tuberculosis Program of the Veterans Administration. P. R. Hawley. —p. 1.
National Tuberculosis Association and Its Interest in the Tuberculous Veteran. H. R. Edwards.—p. 8.
Recent Developments in Tuberculosis Control. H. E. Hilleboe.—p. 17.
Tuberculosis as International Problem. J. A. Doull.—p. 21.
Tuberculosis Experience of United States Army in World War II. E. R. Long.—p. 28.
Significance of Rehabilitation. E. S. Mariette.—p. 38.
Rehabilitation of the Tuberculous: Program of a Municipal Sanatorium. I. D. Bobrowitz.—p. 43.
Occupational Therapy and Rehabilitation. A. N. Aitken.—p. 49.
*Streptomycin in Miliary Tuberculosis: Its Effect on Pathologic Lesions of Generalized Miliary Tuberculosis in Human Beings. A. H. Baggenstoss, W. H. Feldman and H. C. Hinshaw.—p. 54.
Tuberculosis in a Laboratory Monkey Colony: Its Spread and Its Control. K. Habel.—p. 77.
Tuberculosis in Alabama State Hospitals: Mass Radiography for Its Control. A. H. Russakoff.—p. 93.

Streptomycin in Miliary Tuberculosis.—Baggenstoss and his co-workers present clinical, roentgenologic and pathologic observations in 5 cases of miliary tuberculosis treated with streptomycin. Evidence of regression and healing of the miliary

tubercles in the lungs was observed roentgenologically in 4 cases, ophthalmoscopically in the choroid layer of the eye in 2 cases and histologically in the lungs and liver in 4 cases and in the spleen in 3 cases. The development of widespread tuberculous meningitis apparently was inhibited in 1 case and was either prevented or cured in 2 other cases. There was renal tubular damage in 1 case, but outside of that there was no microscopic evidence that streptomycin produces toxic effects. The observations on the 5 cases offer further evidence of the efficacy of streptomycin in tuberculosis and offer some hope for the effective treatment of two hitherto consistently fatal forms of the disease.

Annals of Surgery, Philadelphia

125:257-384 (March) 1947

*Surgical Therapeutic Significance of Functional Behavior of Thyroid Nodules. I D. Puppel, C. P. Leblond and G. M. Curtis.—p. 257.
Malignant Adenoma of Thyroid, with Secondary Metastases to Bone: Discussion of So-Called Benign Metastasizing Goiter. R. E. Outerbridge.—p. 282.
Mechanism of Hemostasis. L. M. Tocantins.—p. 292.
Thoracic Surgery in Hospital Center. L. Miscall and A. W. Harrison.—p. 311.
Modern Technic of Le Fort Operation. R. Tauber.—p. 334.
Compound Injuries of Knee Joint: Study I. Treatment of Noninfected Knee Joints. J. M. Parker and J. J. Modlin.—p. 341.
Treatment of Peripheral Nerve Injuries Complicated by Skin and Soft Tissue Defects. S. E. Potter and E. J. Croce.—p. 349.
*Use of Radioactive Sodium in Study of Peripheral Vascular Disease. Beverly C. Smith and Edith H. Quimby.—p. 360.
Value of External Skeletal Fixation in Elective Orthopedic Surgery. W. J. Stark.—p. 372.

Functional Behavior of Thyroid Nodules.—The histologic picture of nodules of 6 patients with nodular goiter examined by Puppel and his co-workers showed wide variations. The nodules of patients with toxic nodular and toxic diffuse goiter were of the hyperplasia-involution type. All nodules showed a decreased function when compared with the paranodular thyroid tissues. The nodules of patients with nontoxic nodular goiter, toxic nodular goiter, toxic diffuse goiter and so-called fetal adenoma appeared functionally autonomous. They showed less avidity for administered radio iodine, and also much less thyroxine and diiodotyrosine was made by them than by the surrounding thyroid tissue. The diffuse goitrous tissue of 2 patients with nontoxic diffuse colloid goiter showed great avidity for iodine, but its ability to produce thyroxine and diiodotyrosine did not appear greatly increased. The diffuse hyperplastic tissue of a patient with toxic diffuse goiter showed the greatest avidity for iodine and the greatest ability to produce thyroxine and diiodotyrosine. The diffuse paranodular thyroid tissue of 3 patients with nontoxic nodular goiter showed many of the microscopic characteristics of diffuse colloid goiter. It acted biochemically to a greater extent like the tissue of nontoxic diffuse colloid goiter, which indicates that during thyroidectomy it is this tissue which should be left behind to protect the patient against further decrease in the function of the thyroid gland. Iodine should perhaps be given postoperatively to help restore the remaining tissue. The paranodular thyroid tissue of a patient with toxic nodular goiter acted biochemically to a greater extent like the diffuse hyperplastic tissue of toxic diffuse goiter, which suggested that this tissue should be more adequately resected to decrease the incidence of persistence or pseudorecurrence of symptoms.

Radioactive Sodium in Study of Peripheral Vascular Disease.—Smith and Quimby point out that the use of radioactive isotopes as "tracers" is a new method for obtaining information of the status of the peripheral circulation. Radioactive sodium, introduced into a vein, is rapidly carried throughout all the blood vessels and then passes through the capillary walls into the extravascular fluid. The arrival of the material at an extremity and the nature of its build-up there to equilibrium between intravascular and extravascular fluid can be followed with a Geiger-Müller counter. Curves plotted from these data give information regarding arterial blood supply to the extremity. By correlating this with clinical findings, conclusions can be reached regarding the degree of main or collateral circulation. Estimates can be made of the degree of pathologic change in main or peripheral vascular disease. Cases are presented which indicate the manner in which the curves are used to determine when sufficient collateral circulation exists to warrant local conservative therapy. Similar studies at different levels of the leg have given valuable accurate information as to the site for amputation at which healing is to be expected. This has resulted in more amputations being done below the knee. Observations on patients with essential hypertension indicate that this test can be used to select cases which will or will not respond to thoracolumbar sympathectomy.

Archives of Dermatology and Syphilology, Chicago

55:155-308 (Feb.) 1947

*"Eosinophilic Granulomas" of Skin. F. D. Weidman.—p. 155.
Eosinophilic Granuloma: Theoretical and Practical Considerations Based on Study of Case. G. M. Lewis and F. E. Cormia.—p. 176.
Eosinophilic Granuloma of Skin: Its Relation to Erythema Elevatum Diutinum and Eosinophilic Granuloma of Bone; Report of Case. W. F. Lever.—p. 194.
*Granulomatous Hodgkin's Disease of Skin with Extreme Eosinophilia: Eosinophilic Granuloma of Skin? W. L. Dobes and F. D. Weidman.—p. 212.
Treatment of Various Types of Cutaneous Tuberculosis with Promizole and Streptomycin: Preliminary Report. P. A. O'Leary, E. T. Ceder, H. C. Hinshaw and W. H. Feldman.—p. 222.
Elephantiasis Neuromatosa: Manifestation of von Recklinghausen's Disease. R. J. Westcott and L. V. Ackerman.—p. 233.
Dyskeratosis Congenita with Pigmentation, Dystrophia Unguium and Leukoplakia: Patient with Evidence Suggestive of Addison's Disease. J. Garb.—p. 242.
Primary Lichen Amyloidosis: Report of Necropsy. S. S. Greenbaum and J. T. Bauer.—p. 251.
Hyperkeratosis of Palms and Soles Due to Ingestion of Quinacrine Hydrochloride. L. Paxton.—p. 256.
Pseudomonas Aeruginosa Infection of Ear Treated with Streptomycin. J. L. Callaway.—p. 257.
*Dermatitis from Glass Fabrics. L. Schwartz.—p. 258.
Tinea Capitis in Southeastern Tennessee. C. Shaw.—p. 258.

Eosinophilic Granulomas of Skin.—According to Weidman the term "eosinophilic granuloma of the skin" was first used in 1937 by Nanta and Gadrat. The disease is not an entity but a histologic syndrome. In view of the frequent plaquelike involvement of the face, it must be taken into account in the differential diagnosis of apparent sarcoid, leukemia, erythema elevatum diutinum and possibly lupus erythematosus. It is not possible to formulate diagnostic formulas or prognoses to cover all cases of this disease. As cutaneous manifestations appear in Loeffler's syndrome in the form of persistent erythema multiforme, it is in order (1) to determine whether sections of skin in this syndrome exhibit the features of eosinophilic granuloma and (2) to take note of the role of Loeffler's syndrome in dermatology. Eosinophilic granuloma of bone does not appear to be related to eosinophilic granuloma of the skin, but the demonstration of fat in cutaneous lesions opens the way for further inquiry through the avenue of Letterer-Siwe disease. In line with the ideas of Sulzberger concerning histamine and allergy, the thesis is offered that the eosinophilic features are but additive to well known dermatologic entities such as erythema multiforme and Hodgkin's disease and that the eosinophilogenic factors may be responsible for obscuring and/or modifying the typical features of such entities.

Granulomatous Hodgkin's Disease with Extreme Eosinophilia.—According to Dobes and Weidman, granulomatous lesions in Hodgkin's disease are relatively rare in the skin. They develop tardily and incompletely compared with those in the lymphadenoid tissues. It appears that in the initial stages the tissue reaction in the skin is far more acute in type than that in the lymph nodes. In the reported case the extreme polymorphonuclear neutrophil reaction was particularly significant. The fibrosis and the development of Sternberg-Reed cells are so seldom exhibited in the skin that the dermatopathologist is denied this assistance in diagnosis in a way that is not the case for the general pathologist. Lymph nodes are far more promising leads toward histologic diagnosis than the skin. The extraordinary eosinophilia in the reported case may or may not be significant for an interrelationship with eosinophilic granuloma. It remains to be demonstrated whether the scope of Letterer-Siwe disease is sufficiently broad genetically to include Hodgkin's disease, but the demonstration of fat in a lymph node of this patient may be significant.

Dermatitis from Glass Fabrics.—Schwartz calls attention to outbreaks of dermatitis from women's suits and children's coats in which the lining was made of Fiberglass, which mechanically irritated the skin. Investigations disclosed that

dermatitis had developed among girls working on the lining, which was thought to be rayon. The number of cases of dermatitis reported was so great that both the women's suit manufacturer and the babies' coat manufacturer were compelled to recall all the suits and coats, remove the lining and replace it with other fabric. The trade journals and the manufacturers of the Fiberglass fabric were notified of this outbreak of dermatitis, and a warning was given against use of Fiberglass for clothing. Recently reports have been received of dermatitis occurring from glass fabric being used for binding seams in women's dresses.

Archives of Otolaryngology, Chicago

45:145-282 (Feb.) 1947

Congenital Cysts of Tongue, Floor of Mouth, Pharynx and Larynx. G. B. New.—p. 145.
Junction of Nasal Cavity and Pharyngeal Tube in Rat. G. Kelemen. —p. 159.
*Streptomycin Used in Treatment of Suppurative Otitis Media: Preliminary Report. J. B. Holt and F. B. Snell.—p. 169.
Measurement of Overflow Capacity of Maxillary Sinus and Its Significance. B. R. Dysart.—p. 173.
Role of Columellar and Septocolumellar Sutures in Rhinoplasty. J. Daley. —p. 178.
Dental Treatment of Trismus, Tinnitus, Otalgia and Obscure Neuralgias. W. J. Kelly and H. W. Langheinz.—p. 191.
Peroral Endoscopy. L. H. Clerf, J. T. Spencer Jr. and S. A. Fuhring. —p. 245.

Streptomycin for Treatment of Suppurative Otitis Media.—Holt and Snell used streptomycin in 20 cases of suppurative otitis media representing 26 ears infected with gram-negative organisms. Two Gm. of streptomycin was given daily for five days. The 2 Gm. of the drug was dissolved in 24 cc. of sterile water and given in 2 cc. doses intramuscularly every two hours day and night. The ears were dried daily, and streptomycin drops were instilled into the external canals hourly throughout the waking hours. Complete drying of all discharge occurred in 50 per cent of the infected ears. Improvement was noted in 31 per cent. Nineteen per cent showed no improvement. Tests for sensitivity to streptomycin revealed that the infecting organisms varied from 1 to 16 units per cubic centimeter. After treatment the organisms in the cases in which streptomycin failed to effect improvement proved to be resistant to 128 units per cubic centimeter. This suggests a rapid development of resistance to streptomycin.

Archives of Surgery, Chicago

54:117-248 (Feb.) 1947

*Vitamin C in Gastric Resection for Peptic Ulcer. E. de Jesus Zerbini. —p. 117.
Incised Wounds of Head Inflicted by Bayonets. K. H. Abbott.—p. 121.
*Use of Small Threaded Wires in Treatment of Fractures: I. Fractures of Lower Extremities. H. R. McCarroll.—p. 138.
Id.: II. Fractures of Upper Extremities. H. R. McCarroll.—p. 154.
Id.: III. Their Use in Fixation of Bone Grafts. H. R. McCarroll. —p. 170.
*Treatment of Deep Venous Thrombosis with Reference to Subcutaneous Injection of Heparin and Use of Dicumarol. W. D. Holden.—p. 183.
Pathognomonic Sign for Cyst of Knee Cartilage. A. J. Pisani.—p. 188.
Progress in Orthopedic Surgery for 1945: IV. Conditions Involving Hip Joint. J. J. Fahey.—p. 191.
Id.: V. Conditions Involving Foot and Ankle. E. D. W. Hauser and R. P. Montgomery.—p. 201.
Id.: VI. Congenital Dislocation of Hip. A. B. Gill.—p. 218.
Review of Urologic Surgery. A. J. Scholl, F. Hinman and A. B. Hepler and others.—p. 220.

Vitamin C in Gastric Resection for Peptic Ulcer.—The observations reported by de Jesus Zerbini were made on 2 vitamin C deficient patients with duodenal ulcer subjected to gastric resection. One with a total, though unsuspected, absence of ascorbic acid in white cells and plasma, without clinical manifestations and uncorrected by preoperative therapy, exhibited severe surgical shock during operation, which seemed to respond promptly to the intravenous injection of 2 Gm. of the vitamin. The other, with a known absence of ascorbic acid in plasma and white cells, completely corrected before operation, exhibited after operation a fall to zero in the plasma level, with no corresponding fall in the white cell level in spite of the daily injection of 200 mg. of the vitamin; on removal of stitches on the seventh postoperative day, the wound showed no evidence of healing. This suggests that a low or zero level of plasma ascorbic acid should not be looked on as harmless and that a sufficient amount should be given after operation in order to maintain a high plasma level.

Small Threaded Wires in Treatment of Fractures.—McCarroll discusses the use of small threaded wires in the treatment of fractures. The small size of the wire, the excellent fixation afforded by the threads and the minimum amount of trauma to bone and soft tissues render them superior to other forms of internal fixation in certain types of fractures. The method has been used for comminuted intertrochanteric fractures of the femur, for spinal or oblique fractures of the tibia and fibula and for fractures about the ankle joint. The small threaded wire can be used in fractures of the clavicle, in dislocation of the acromioclavicular joint, in fractures of the proximal end of the humerus, for fractures of the epicondyle of the humerus with displacement, in comminuted fractures of the lower end of the humerus with extreme displacement of the fragments, in fractures of the olecranon and in fractures and dislocations of the metacarpals.

Heparin and Dicumarol in Treatment of Deep Venous Thrombosis.—Holden presents a plan for the treatment of venous thrombosis embracing the physiologic principles underlying the use of and the indications for anticoagulant therapy, venous ligation and anesthesia of the paravertebral sympathetic system. Sixteen of 31 patients with venous thrombosis had pulmonary infarcts before the diagnosis of peripheral venous thrombosis was made. All 31 patients were treated primarily with subcutaneous administration of heparin and dicumarol. Five of the 31 patients had ligations of the superficial femoral vein, and 3 had paravertebral sympathetic blocks. All recovered.

Arkansas Medical Society Journal, Fort Smith

43:229-256 (March) 1947

Cancer of Thyroid Gland. J. H. Hayes.—p. 229.
Injuries Involving Accessory Nasal Sinuses. E. C. Gay and W. G. Sittler.—p. 231.
Surgical Experiences with Vascular Disease. H. Mahorner.—p. 236.

43:257-284 (April) 1947

Tuberculosis Control Activities of Arkansas State Board of Health. A. C. Curtis.—p. 257.
Consideration of Surgical Complications of Amebiasis of Colon and Rectum. D. B. Stough Jr.—p. 261.
Trends in Tuberculosis Control Procedures. H. R. Edwards.—p. 270.

Blood, New York

2:111-216 (March) 1947

Dietary Factors Concerned in Erythropoiesis. G. E. Cartwright.—p. 111.
Effect of Diet on Hemoglobin, Erythrocyte and Leukocyte Content of Blood of Rhesus Monkey (Macaca Mulatta). Edith S. Jones, K. B. McCall, C. A. Elvehjem and P. F. Clark.—p. 154.
Hemopoiesis in Riboflavin Deficient Rats. K. M. Endicott, A. Kornberg and Maurine Ott.—p. 164.
Hematologic Response in Dogs to Administration of Anti Spleen Serum. J. B. Miale.—p. 175.
Contribution to Pathogenesis of Hemophilia. A. Pavlovsky.—p. 185.
Renal Function During Chronic Anemia in Man. S. E. Bradley and Geraldine P. Bradley.—p. 192.

Bulletin of Johns Hopkins Hospital, Baltimore

80:1-106 (Jan.) 1947

*Objective Studies of Some Physiologic Responses in Mild Chronic Trench Foot. G. E. Burch, H. L. Myers, R. R. Porter and N. Schaffer.—p. 1.
Use of Psychosomatic Concept in Medicine. F. Deutsch.—p. 71.
Use of Psychosomatic Concept in Social Case Work. E. E. Cockerill. —p. 86.
*Elimination of Poliomyelitis Virus from Human Mouth or Nose. R. Ward and B. Walters.—p. 98.

80:107-148 (Feb.) 1947

Physiologic Studies in Congenital Heart Disease: I. Procedures. R. J. Bing, L. D. Vandam and F. D. Gray Jr.—p. 107.
Id.: II. Results of Preoperative Studies in Patients with Tetralogy of Fallot. R. J. Bing, L. D. Vandam and F. D. Gray Jr.—p. 121.
Lipotropic Effect of N¹-Methylnicotinamide. V. A. Najjar and I. M. Ratcliffe.—p. 142.

Physiologic Responses in Trench Foot.—Burch and his co-workers aimed to find an objective test which would aid in determining whether or not patients who formerly had acute trench foot are still showing evidences of active disease. This

study is based on the premises that trench foot is an inflammatory disease produced by exposure to cold and moisture and that tissue reaction and repair persist long after initial exposure. Temperature studies by means of skin thermocouples supplemented by evaluations of skin color and the rate of refilling of pressure emptied skin vessels were used to uncover local inflammation and the rate of circulation. The comparative rates of water loss from the skin of normal and trench foot subjects were also observed. There was practically no difference in sweating between normal and trench foot subjects. The initial temperature of the foot of the mild chronic trench foot subject was higher than that of the normal subject, and there was a direct correlation between the clinical severity of the disease and the height of this temperature. Trench foot subjects did not adapt to environmental cooling like the controls. This fact was demonstrated by studies conducted on the refilling time of pressure emptied skin vessels. An "activity index" based on the initial stabilization temperature, number of degrees temperature fall following fifteen minutes of occlusion and rise during hyperemia after release of the circulation can be devised to express the amount of inflammatory activity in a part injured by cold and moisture. Such an index might be further supported by data on the refilling time of pressure emptied skin vessels.

Elimination of Poliomyelitis Virus from Mouth or Nose.—Ward and Walters carried out tests on 19 patients in the early stages of poliomyelitis. Virus was demonstrated in material expelled from the mouth or nose of 2 of the 19 patients. This was achieved by having patients blow and spit into cloth masks from which virus was extracted. Virus was also detected in nasal swabs of the first patient and pharyngeal swabs of the second patient shown to have eliminated virus from the mouth or nose. In 5 additional patients virus was isolated only from swabs of the pharynx. This is believed to be the first demonstration of virus elimination from mouth or nose under circumstances which come fairly close to being natural.

Cancer Research, Baltimore

7:129-192 (March) 1947

Sensitivity of Different Tissues in Street Strain Mice to 9,10-Dimethyl-1,2-Benzanthracene. J. Engelbreth-Holm and R. Rask-Nielsen.—p. 129.
Induction of Neoplasms in Five Strains of Rats with Acetylaminofluorene. W. F. Dunning, M. R. Curtis and M. E. Madsen.—p. 134.
Observations on Radiation Induced Lymphoid Tumors of Mice. H. S. Kaplan.—p. 141.
Changes in Succinoxidase Activity of Livers from Rats During Development of Hepatic Tumors on Feeding p-Dimethylaminoazobenzene. Cornelia Hoch-Ligeti.—p. 148.
Production of Tumors in Livers of Rats Fed m-Methyl-p-Dimethylaminoazobenzene. Ruth Cortell.—p. 158.
p-Dimethylaminoazobenzene Carcinogenesis with Purified Diets Varying in Content of Cysteine, Cystine, Liver Extract, Protein, Riboflavin and Other Factors. P. N. Harris, M. E. Krahl and G. H. A. Clowes.—p. 162.
Effect of Biotin on p-Dimethylaminoazobenzene Carcinogenesis. P. N. Harris, M. E. Krahl and G. H. A. Clowes.—p. 176.
Effect of Diet Containing Dried Egg Albumin on p-Dimethylaminoazobenzene Carcinogenesis. P. N. Harris.—p. 178.
Etiologic Factors in Carcinoma of Penis. R. Schrek and H. Lenowitz.—p. 180.

Diseases of Chest, Chicago

13:91-188 (March-April) 1947

*Physiologic and Antibiotic (Penicillin) Therapy in Chronic Hypertrophic Pulmonary Emphysema. A. L. Barach and Bettina Garthwaite, with technical assistance of Eva Levenson and Dora Rader.—p. 91.
*Treatment of Thoracic Empyema with Sodium Tetradecyl Sulfate 1:500 in Azochloramid 1:3,300. E. H. Tonolla and O. C. Brantigan.—p. 123.
*Treatment of Tension Cavities with Pneumothorax. I. D. Bobrowitz.—p. 133.
Pneumoperitoneum with Diaphragmatic Paralysis in Treatment of Pulmonary Tuberculosis. D. J. Gilmore.—p. 153.

Physiologic and Antibiotic Therapy in Pulmonary Emphysema.—Of 86 courses of treatment administered by Barach and Garthwaite in 51 cases of pulmonary emphysema, clinical improvement attributable chiefly to penicillin, administered as an aerosol in most cases and with systemic administration in resistant cases, was definite in 20, moderate in 19 and slight in 25; in 22 no improvement took place. The results of physiologically directed therapy, a combination of periodic administration of aminophylline and epinephrine, bed rest, administration of meperidine hydrochloride (demerol), manual compression of the upper abdomen underneath the ribs during the latter part of expiration and inhalation of 70 to 100 per cent oxygen for twenty to thirty minutes two or four times daily, in the same group were definite improvement in 9, moderate in 36, slight in 23 and none in 18. Of a total of 86 courses, 66 patients manifested moderate or pronounced improvement. In analyzing the role played by each therapeutic factor, 31 of the 66 improved cases appeared to be more influenced by physiologic therapy and 27 by penicillin treatment, with an equal effectiveness in 8 cases. In some of the cases in this series previous exposure to physiologic therapy had resulted in a baseline of improvement which gave the appearance of less striking effect from this type of therapy than might have been anticipated in cases in which the procedures used in bronchial relaxation and inhalational therapy had not been employed. The study of the sputum culture before and after treatment revealed the characteristic disappearance of gram positive organisms in the majority of cases with replacement by gram negative bacteria.

Treatment of Thoracic Empyema.—Tonolla and Brantigan employed sodium tetradecyl sulfate 1:500 in azochloramid 1:3,300 in the treatment of 7 patients subjected to aspiration of the pleural cavity with instillation of this chemotherapeutic agent. The effect of this substance is to lower surface tension, thereby allowing better penetration of the antiseptic agent, and to facilitate the removal of the exudate. The solution tends to prevent reformation of intrapleural fluid while sterilizing the area. These patients recovered and remained well. If the infection is not eliminated in three to six days, as it happened in the seventh case, either closed or open thoracotomy should be resorted to. Twenty-eight patients were treated with closed drainage and 20 patients with open thoracotomy. In none has there been a chronic empyema.

Journal of Allergy, St. Louis

18:81-148 (March) 1947

Reactions to Antipneumococcal Rabbit Serum: V. Effects on Reversed Passive Anaphylaxis of Lengthening Interval Between Constant Sensitizing Doses of Pneumococcal Polysaccharide and Constant Shocking Doses of Antipneumococcal Rabbit Serum: VI. Diminution of Circulating Pneumococcal Polysaccharide: VII. Variations in Reversed Passive Anaphylactogenic Properties of Different Lots of Antipneumococcal Rabbit Serum. O. Swineford Jr., M. A. Holliday, P. Webb and H. R. Pearsall.—p. 81.
Delayed Absorption of Proteins in Guinea Pig. J. R. Ross.—p. 86.
Quantitative Changes in Various Fractions of Precipitable Nitrogen in Ragweed Extracts During Incubation (37 C.). F. A. Stevens.—p. 90.
Sensitization by Topical Application of Sulfonamides. M. B. Sulzberger, A. Kanof, R. L. Baer and Clare Lowenberg.—p. 92.
*Effective Treatment of Extremely Sensitive Hay Fever Patients by Chilling Method. L. C. Lazarowitz.—p. 104.
*Penicillin in Intractable Asthma. M. W. Miller.—p. 109.
Etiologic Evaluation of Asthma in 100 Cases Returned from Overseas. A. P. Fishman.—p. 115.

Treatment of Sensitive Hay Fever Patients.—Lazarowitz thinks that the disadvantages of treating hay fever patients with injections are due in many instances to the too rapid absorption of the antigen, especially in those most sensitive. Many attempts have been made to slow the absorption of pollen extracts by the addition of various substances known to cause delay. The principle of chilling is presented as a new approach to solve the problem of slow absorption of allergenic extracts. A small ice bag supported by a bandage was applied to the midouter part of the arm for fifteen minutes prior to and for fifteen minutes subsequent to the subcutaneous injection of ragweed extract to retard the circulation in and around the site of the injection. Thirty hay fever patients were treated with dosages exceeding three to four times the routine dosage of ragweed extract due to the retardation of absorption following the vasoconstriction of chilling. The chilling procedure is time saving, since it diminishes the number of visits by 40 per cent. Constitutional reactions occurred seldom, and no delayed reaction was observed. The treatment gave effective relief of symptoms of hay fever in all treated patients. Chilling renders the injections painless.

Penicillin in Intractable Asthma.—Miller reports observations on 26 adults and 3 children to whom penicillin was administered at three hour intervals in doses of 12,500 or 25,000 units. The average total dose was 1,000,000 Oxford units. Eleven of the 29 patients showed an excellent response while receiving penicillin; they became symptom free or so nearly so

that they required no symptomatic therapy. Eleven showed improvement but continued to require occasional, although less frequent, symptomatic treatment. Seven showed no change whatever either during the hospital course or thereafter. Penicillin cannot be considered a panacea for intrinsic asthma. It should be regarded as a treatment of infectious processes and as such seems to be effective in selected cases of bacterial asthma.

Journal of Clinical Investigation, Boston

26:1-144 (Jan.) 1947. **Partial Index**

Cardiac Output in Man: Studies with Low Frequency, Critically Damped Ballistocardiograph and Method of Right Atrial Catheterization. J. L. Nickerson, J. V. Warren and E. S. Brannon.—p. 1.
Intubation Studies of Human Small Intestine: XXV. Absorption of Galactose from Intestine of Normal Individuals and Thyrotoxic Patients. V. Moseley and F. W. Chornock.—p. 11.
Nutritional Requirements for Nitrogen Balance in Surgical Patients During Early Postoperative Period. Cecilia Riegel, C. E. Koop, J. Drew, L. W. Stevens and J. E. Rhoads, with technical assistance of Louisa Bullitt and others.—p. 18.
*Metabolic Effects of Steroid Hormones in Osteoporosis. E. D. Reifenstein Jr. and F. Albright.—p. 24.
Immunologic Studies in Insulin Resistance: III. Measurement of Insulin Antagonist in Serum of Insulin Resistant Patient by Blood Sugar Curve Method in Mice. F. C. Lowell.—p. 57.
Trichinella Skin Tests in Orphanage and Prison: Comparison with Serologic Tests for Trichinosis and with Tuberculin Reaction. G. T. Harrell, S. F. Horne, J. K. Aikawa and Nancy J. Helsabeck.—p. 64.
*Pamaquine Naphthoate as Prophylactic for Malarial Infections. H. A. Feldman, H. Packer, F. D. Murphy and R. B. Watson.—p. 77.
Electrophoretic Changes in Serum of Patient with Rheumatoid Arthritis. V. P. Dole and S. Rothbard, with technical assistance of K. Winfield.—p. 87.
Variation in Protein and Polysaccharide Content of Serums in Chronic Diseases, Tuberculosis, Sarcoidosis and Carcinoma. Florence B. Seibert, Mabel V. Seibert, A. Jane Atno and H. W. Campbell.—p. 90.
Anemia of Infection: III. Uptake of Radioactive Iron in Iron Deficient and in Pyridoxine Deficient Pigs Before and After Acute Inflammation. M. M. Wintrobe, G. R. Greenberg, S. R. Humphreys and others.—p. 103.
Circulating Red Cell and Plasma Volume and Distribution of Blood in Large and Minute Vessels in Experimental Shock in Dogs, Measured by Radioactive Isotopes of Iron and Iodine. J. G. Gibson 2d, A. M. Seligman, W. C. Peacock and others.—p. 126.

Steroid Hormones in Osteoporosis.—Reifenstein and Albright studied the effect of certain steroid hormones, notably estrogens, androgens and progesterone, in 11 cases of osteoporosis: 5 cases of the postmenopausal type, 1 case of the senile type, 2 cases of the type seen following orthopedic operations (atrophy of disuse) and 3 cases of the Cushing's syndrome type. Estradiol benzoate and diethylstilbestrol decreased the calcium and phosphorus excretions in the four types of osteoporosis studied. Testosterone propionate and methyl testosterone decreased the calcium and phosphorus excretions in the postmenopausal, senile and Cushing's syndrome osteoporosis. Progesterone in the dosages of 10, 25 and 100 mg. daily had no effect whether given alone or in combination with an estrogen. The effect on the calcium metabolism of estrogen and androgen in combination was greater than that of either alone in the postmenopausal and senile groups. In Cushing's syndrome estrogen probably does have a beneficial effect on the calcium balance, previous statements to the contrary from this clinic notwithstanding. Testosterone compounds have a much more striking effect in this condition, as opposed to other types of osteoporosis.

Pamaquine Naphthoate as Prophylactic for Malarial Infections.—"Pamaquine" is the term the United States Pharmacopeia applies to plasmoquine, 6-methoxy-8-(1-methyl-4-diethylamino) butyl-aminoquinoline. Feldman and his associates administered pamaquine naphthoate to 36 patients with dementia paralytica as a prophylactic against mosquito induced infections with Plasmodium vivax and Plasmodium falciparum. Daily doses of either 160 or 180 mg. administered the day before, the day of and for five or six days after the day of inoculation with P. vivax have prevented or postponed the primary attack for months. In the case of P. falciparum postinoculation treatment could be shortened to three days with similar results, except that delayed primary attacks were not observed. Two instances of acute hemolytic anemia were encountered among 11 Negro patients. One of these was reexposed to the drug and promptly had another hemolytic episode. Methemoglobinemia was regularly encountered in all subjects. Elevations of the serum bilirubin and moderate hematocrit decreases were commonly noted among those receiving the higher, more prolonged courses, regardless of race. Pamaquine naphthoate is rapidly absorbed and excreted.

Journal Industrial Hygiene & Toxicology, Baltimore

29:59-144 (March) 1947

Leroy Upson Gardner, 1888-1946. P. Drinker.—p. 59.
Quinone Vapors and Their Harmful Effects: I. Corneal and Conjunctival Injury. J. H. Sterner, F. L. Oglesby and B. Anderson.—p. 60.
Id.: II. Plant Exposures Associated with Eye Injuries. F. L. Oglesby, J. H. Sterner and B. Anderson.—p. 74.
Toxicity of 2,4 Dichlorophenoxyacetic Acid for Experimental Animals. E. V. Hill and H. Carlisle.—p. 85.
Study of Hazards of Exposure to Metallic Fumes and Dust in Brass Foundries. W. W. Stalker.—p. 96.
Study of Pneumonia in Shipyard Workers, with Special Reference to Welders. M. F. Collen.—p. 113.
Acute and Chronic Toxicity of Methyl Chloride: II. Symptomatology of Animals Poisoned by Methyl Chloride. W. W. Smith and W. F. von Oettingen.—p. 123.
Microscopic Detection of Cadmium Oxide Particles in Lung Tissue. R. E. Thiers, E. M. S. Arthur, J. R. Mills, D. R. Hamly and F. E. Beamish.—p. 129.
*Duodenal Ulcer Following Exposure to Carbon Tetrachloride: Report of 2 Cases. Adelaide R. Smith.—p. 134.
Rapid Method for Determination of Chromic Acid Mist in Air. L. Silverman and J. F. Ege Jr.—p. 136.
*Loose versus Close Fitting Clothing for Work in "Tropical Heat." C. P. Yaglou and M. N. Rao.—p. 140.

Duodenal Ulcer Following Exposure to Carbon Tetrachloride.—In the 2 cases of carbon tetrachloride poisoning reported by Smith, duodenal ulcer followed exposure to toxic concentrations of this solvent. In neither case had there been any previous history of digestive disturbance. While it is recognized that silent cases of ulcer do occur, the development in both these instances of ulcer symptoms following promptly on severe exposure is believed strongly suggestive of a causal relationship. A review of case histories of carbon tetrachloride poisoning suggests that the development of peptic ulcer, even though infrequently reported, may not be an uncommon complication.

Loose versus Close Fitting Clothing for Work in "Tropical Heat."—Yaglou and Rao carried out tests which demonstrate that in tropical heat, when solar radiation is not a factor, any clothing is a hindrance to loss of body heat. If clothing must be worn it should be loose fitting and of light weight; it should expose as much skin area as possible and should be designed for maximum ventilation. Clothing designed for skin ventilation by "bellows action" is more efficient for evaporative cooling during work in tropical heat than is a close fitting absorbent garment.

Journal of Investigative Dermatology, Baltimore

8:53-122 (Feb.) 1947

*Poison Oak Dermatitis: Studies on Hematologic, Urinary and Temperature Changes. H. J. Templeton, C. J. Lunsford and H. V. Allington.—p. 53.
Nature of Halogen Sensitivity in Dermatitis Herpetiformis and Pemphigus: Preliminary Report. Z. Felsher.—p. 55.
Modifications of Goldman Technic for Contact Testing of Buccal Mucosa. J. Farrington.—p. 59.
Antipruritic Qualities of Papaverine Hydrochloride. L. Wirth.—p. 63.
Steatocystoma Multiplex: Analysis of Their Contents. F. W. Lynch and I. Fisher.—p. 65.
Pyribenzamine in Experimental Nonallergic and Allergic Dermatitis. R. L. Mayer.—p. 67.
Spontaneous Cure of Tinea Capitis in Puberty. S. Rothman, A. Smijanic, A. L. Shapiro and A. W. Weitkamp.—p. 81.
Cicatricial Alopecias: Historical and Clinical Review and Histologic Investigation. C. W. Laymon.—p. 99.

Poison Oak Dermatitis.—Templeton and his co-workers studied the effect of severe poison oak dermatitis on the temperatures and blood counts of 106 patients. Of 79 patients who could give an exact date of exposure the first lesions were noted within twenty-four hours by 54 patients. In 60 of the patients the dermatitis required three to five days from onset to reach its greatest intensity. Little systemic reaction takes place in severe poison oak dermatitis. About four fifths of the patients reacted with slight fever. About half had a mild leukocytosis and about half had a moderate eosinophilia. The urines of all patients were normal.

Journal of Nat. Cancer Inst., Washington, D. C.

7:103-182 (Dec.) 1946. **Partial Index**

Hypervolemia Secondary to Grafted Granulosa Cell Tumor. J. Furth and H. Sobel.—p. 103.
Blood Uric Acid and Proteuse, Body Temperature and Glomerular Clearance of Rabbits Implanted with Brown-Pearce Carcinoma and Treated with Polysaccharide from Serratia Marcescens. B. B. Westfall and Thelma B. Dunn.—p. 115.
Avenues of Approach to Gastric Cancer Problem. M. K. Barrett. —p. 127.
*Effect of Prolonged Ingestion of Thiourea on Mammary Glands and Appearance of Mammary Tumors in Adult C3H Mice. H. P. Morris, Celia S. Dubnik and A. J. Dalton.—p. 159.
Cultivation of Tumors in Anterior Chambers of Eyes of Guinea Pigs. Helen M. Dyer and Margaret G. Kelly.—p. 177.

Effect of Prolonged Ingestion of Thiourea on Mammary Tumors in Mice.—Virgin strain C3H mice aged 11 months without palpable spontaneous mammary tumors were divided by Morris and his associates into two groups. One group was placed on a stock diet of natural foodstuffs to which was added thiourea. The animals ingested thiourea until mammary tumors developed, or from a minimum of two to a maximum of sixty-three weeks. The control group was maintained on the stock diet throughout. The incidence of spontaneous mammary tumors was essentially the same in the two groups. The appearance of the tumors was delayed in the thiourea treated group. The average time till tumors appeared was 16.2 weeks in the treated group and 8.7 in the control, a statistically significant difference.

Journal National Malaria Society, Tallahassee, Fla.

5:169-232 (Sept.) 1946. **Partial Index**

Study of Winter DDT House Spraying and Its Concomitant Effect on Anophelines and Malaria in Endemic Area. T. H. G. Aitken. —p. 169.
Review of Malaria Studies and Control in Tennessee Valley in 1945. R. B. Watson, C. C. Kiker and A. D. Hess.—p. 193.
Training Aids for Entomologic Phases of Malariology. M. H. Goodwin Jr., S. J. Carpenter and F. Fisk.—p. 205.
Studies on Serology of Malaria: II. Hemoglobin Precipitation with Lipid Antigen. A. H. Wheeler, Elizabeth B. McDermott, J. Adler and R. L. Kahn.—p. 209.
Inadequate House Screening as Factor in Malaria Transmission. M. Kenney.—p. 223.

5:233-284 (Dec.) 1946. **Partial Index**

Definition of Malaria Control. F. L. Knowles.—p. 233.
Malaria Control Activities During Construction of Advanced Tropical Naval Base. A. A. Weathersbee.—p. 263.
Planning for Malaria Prevention on Postwar Impoundments. N. H. Rector.—p. 277.

Journal of Neurosurgery, Springfield, Ill.

4:1-96 (Jan.) 1947

On Being a Literary Executor. J. F. Fulton.—p. 1.
Nutritional Study of Neurosurgical Patients, with Special Reference to Nitrogen Balance and Convalescence in Postoperative Period. J. H. Drew, C. E. Koop and R. P. Grigger.—p. 7.
Nerve End Separation Following Suture: Resection of Neck of Fibula in Suture of Peroneal Nerve. K. E. Livingston, W. K. Livingston and D. Andrus.—p. 16.
*Surgical Treatment of Angina Pectoris. I. Lindgren and H. Olivecrona. —p. 19.
Care and Rehabilitation of Patients with Injuries of Spinal Cord and Cauda Equina: Preliminary Report of 113 Cases. W. G. Kuhn Jr. —p. 40.
Observations on Use of Tantalum Foil in Peripheral Nerve Surgery. N. C. Norcross and J. T. Bakody.—p. 69.

Surgical Treatment of Angina Pectoris.—Lindgren and Olivecrona state that in 7 patients whom they treated by section of the five superior dorsal roots the results were not gratifying. Most patients had moderate relief from pain, but none were completely or permanently free from discomfort. In some patients attacks of angina pectoris returned; 1 patient had a constant feeling of oppression in the chest and another developed anesthesia dolorosa. Resection of the stellate ganglion according to Leriche was employed in 2 patients, in whom moderate improvement was obtained. Of a series of 250 patients with cardiac pain, 71 patients were selected for resection of the stellate and the four upper thoracic ganglions. Operative indication was severe angina pectoris resistant to medical treatment. Two cases of cardiovascular syphilis were included. Three patients died during the operation, 2 of them probably from myocardial infarction and 1 from valvular pneumothorax. In 8 other patients myocardial infarction occurred within one month after the operation. In 3 of them the infarct was fatal. The most common complication was painful neuritis, usually of short duration. Transient phrenic nerve paralysis was observed. The "migration of pain" phenomenon was observed. In 1 case in which the anginal pain had migrated to the jaws, bilateral tractotomy gave an excellent result. The results of the extensive cervicothoracic ganglionectomy were gratifying. The operation gave complete or nearly complete relief from pain in 44 per cent, and in 41 per cent it converted severe forms of angina pectoris into milder types. The sensation of fear connected with the pain disappeared in many patients. On emotion or exercise all patients postoperatively experienced a choking sensation or slight pain, which served them as a "warning signal."

Journal of Nutrition, Philadelphia

33:251-360 (March) 1947

Relationship of Nicotinic Acid, Tryptophan and Protein in Nutrition of the Pig. R. W. Luecke, W. N. McMillen, F. Thorp Jr. and Carolyn Tull.—p. 251.
Riboflavin Deficiency in Dairy Calf. A. C. Wiese, B. C. Johnson, H. H. Mitchell and W. B. Nevens.—p. 263.
Formation of Capillaries and Other Tissue Changes in Cornea of Methionine Deficient Rat J. L. Berg, E. R. Pund, V. P. Sydenstricker and others.—p. 271.
*Work Performance, Respiratory Exchange and Certain Blood Constituents After Isocaloric Meals of Low and High Carbohydrate Content. J. Haldi and W. Wynn.—p. 287.
*Improving Nutritive Value of Flour: I. Effect of Supplementing Enriched Flour with Other B Complex Vitamins. Beulah D. Westerman and Gertrude Hall.—p. 301.
Amino Acids Required to Supplement Linseed Protein for Chick Growth. F. H. Kratzer, D. Williams and Elizabeth F. Baker.—p. 313.
Inborn Characteristic Determining Response of Chickens to Diet Free of Animal Protein. H. R. Bird, M. Rubin and A. C. Groschke. —p. 319.
Surface Area and Metabolism of Growing Guinea Pigs. H. H. Kibler, S. Brody and D. Worstell.—p. 331.
Growth Promoting Factor for Rats Present in Summer Butter. J. Boer, B. C. P. Jansen and A. Kentie.—p. 339.
Growth Promoting Action of Vaccenic Acid. J. Boer, B. C. P. Jansen, A. Kentie and H. W. Knol.—p. 359.

Work After Carbohydrate Meals.—Haldi and Wynn describe studies which revealed that work output, muscular efficiency and percentage recovery (measured by a comparison of the work performance in the first and second exercise periods) were not diminished by a high carbohydrate intake two to three hours before exercise. After a meal rich in carbohydrate the blood sugar level immediately before exercise was higher than at the corresponding time after the low carbohydrate meal. The data of these experiments are offered as confirmatory evidence for the conclusion drawn from other observations that a hypoglycemic reaction is not the usual physiologic response to a high carbohydrate meal.

Improving Nutritive Value of Flour.—Westerman and Hall describe experiments carried out to determine the effect of supplementing enriched flour with other B complex vitamins. Evidence is presented to show that the addition of riboflavin, thiamine, calcium pantothenate and pyridoxine to enriched flour improves the nutritive value.

Kansas Medical Society Journal, Topeka

48:57-104 (Feb.) 1947

Physical Rehabilitation of the Severely Handicapped. E. C. Elkins. —p. 57.
Carcinoma of Rectum—Review of 215 Cases. T. M. Johnson.—p. 62.
Biopsy. C. A. Hellwig.—p. 66.

48:105-148 (March) 1947

*Obstructive Laryngitis in Children Caused by Hemophilus Influenzae Bacillus Type B. H. V. Davis.—p. 105.
Demerol as Preanesthetic Agent. C. A. Hunter Jr., R. Hale and P. H. Lorhan.—p. 109.
Appendix Epiploica Resembling Vermiform Appendix. H. B. Latimer and A. H. Hinshaw.—p. 111.

Obstructive Laryngitis Caused by Hemophilus Influenzae Bacillus Type B.—Davis thinks that the importance of laryngeal infections caused by Hemophilus influenzae bacillus type B in children is not generally recognized. Unless the clinical features of this rapidly developing infection are recognized, in many instances proper treatment will not be instituted

in sufficient time to prevent death. The onset is abrupt. The child becomes fretful and complains of a sore throat accompanied with difficulty in swallowing. There develops in extremely rapid progression respiratory distress with inspiratory retraction of the sternum and soft tissues, cyanosis, hoarseness and a croupy cough. Prostration is out of proportion to the short duration of the illness. The children are frequently limp, in shock and moribund within eight to twelve hours after the onset of symptoms. The temperature ranges from 100 to 104 F. Examination of the oropharynx usually shows that it is intensely red and edematous. The epiglottis and glottis are swollen and fiery red. Membranes are notable by their absence. The principal laboratory findings are leukocytosis of 15,000 cells or more and a polymorphonuclear leukocytic count of 80 or 90 per cent. The diagnosis can be confirmed by recovering H. influenzae type B in cultures taken from the nasopharynx, the oropharynx, the larynx or the blood. The three cardinal therapeutic measures to be executed should include the performance of a tracheotomy for relief of respiratory obstruction, the administration of sulfadiazine and type B H. influenzae rabbit antiserum, and the administration of parenteral fluids to combat or prevent shock. Davis presents 3 illustrative cases.

Military Surgeon, Washington, D. C.

100:205-288 (March) 1947

Future Research in Aviation Medicine. M. C. Grow.—p. 205.
Program for the Deaf. R. T. McIntire.—p. 207.
Recent Experiences in Treatment of Kala-Azar. W. H. Hargreaves. —p. 212.
Dental Program of Veterans Administration. V. D. Irwin.—p. 215.
Medical Consultants Division of Surgeon General's Office. A. Freer. —p. 220.
Sanitary Corps Functions and Organization. W. A. Hardenbergh. —p. 222.
Amputations: Care of Amputee Patients. T. C. Ryan.—p. 224.
Enteric Protozoa and Helminth Finding as Influenced in War Years. J. W. Colvin, T. K. Ruebush, J. L. Avery and R. N. Lanier.—p. 229.
Neuropsychiatry at Separation Center. J. M. Schneck.—p. 232.
Health of the Army. N. T. Kirk.—p. 234.
*Environment and Fatal Heat Stroke: Analysis of 157 Cases Occurring in the Army in U. S. During World War II. Elizabeth Schickele. —p. 235.

Environment and Fatal Heat Stroke.—Schickele analyzes 198 cases of heat fatalities suffered by soldiers in training in the United States from 1942 to 1944 and made available by the Army Institute of Pathology. From these, 157 were selected in which no cardiac or other disease or other effect which would predispose to increase in body temperature could be found, and in which therefore death might be presumed to have been due only to the effects of exposure to heat. Heat deaths are found to be caused by the heat load, as determined by climate, activity and body build. These factors cannot be considered separately but must be treated as components of the total heat stress. A considerable amount of the variation of the weather conditions under which individuals became ill may be attributed to the interaction of all factors influencing heat stress. "Rapid acclimatization" of one week or ten days cannot be expected to confer complete immunity to heat injury for men who are working in the sun during the heat of the day, when weather conditions exceed those of the "heat death line." One third of the patients who died had spent a month or less in the heat before death occurred, with as many deaths after four weeks' exposure as after one week's exposure. Incidence fell off rapidly for longer acclimatization periods. Susceptibility to heat stroke appears to be particularly high among persons acclimated to an atmospheric cooling power above a certain level (about 600 calories hourly per square meter of body surface) when they are exposed to an atmospheric cooling power reduced below this level. A map is drawn showing three cooling power zones in the United States. In the most northerly, the heat stress on the average is apparently not sufficiently high to confer acclimatization for work in the sun when conditions are more severe than those of the "heat death line." Persons living in this zone will therefore be particularly susceptible to heat injury during unusual heat waves or excursions to hotter climates. Most fatalities associated with heavy exercise occur at relatively low temperatures, when the total heat stress is commonly underestimated.

New Jersey Medical Society Journal, Trenton

44:87-124 (March) 1947

The Physician and Social Responsibilities. E. W. Sprague.—p. 90.
Treatment of Meningococcic Meningitis. Emilie V. Rundlett and C. M. Leevy.—p. 95.
Scabies Among the Well Washed. S. Friedenberg.—p. 99.
Maternal Mortality—Some Aspects of Its Preventability. J. F. Norton and Edith K. Mangone.—p. 101.
Successful Financial Plan for Group Practice. M. G. Bensley and C. C. Carpenter.—p. 108.

New Orleans Medical and Surgical Journal

99:373-430 (Feb.) 1947

Saddle Block Anesthesia: Its Application to Obstetrics. R. T. Parmley and J. Adriani.—p. 373.
Prevention of Rh Isoimmunization Due to Blood Transfusion. J. W. Davenport.—p. 376.
Diverticulosis of Colon. F. A. Benitez.—p. 382.
Amniotome. W. D. Beacham.—p. 385.
Treatment of Gambian Trypanosomiasis. J. K. Miller.—p. 386.
Biotin. B. W. Alspach.—p. 397.

99:431-484 (March) 1947

Heart Disease in Charity Hospital in New Orleans: Survey of 8,313 Routine Autopsies. J. E. Holoubek, Alice Baker Holoubek and DeW. T. Baker.—p. 431.
Repair of Choledochus Defect by Hepaticoduodenostomy Over Vitallium Tube. M. L. Michel Jr.—p. 437.
Fever of Undetermined Origin. H. L. Wolf and S. Jacobs.—p. 441.
Cataract Surgery as Done in India Today. G. DeW. Rackley.—p. 448.
Pathologic Physiology of Diabetes Mellitus. D. L. Gordon.—p. 451.

Occupational Medicine, Chicago

3:1-108 (Jan.) 1947

Employment of Persons with Certain Physical and Neuropsychiatric Impairments: Aspects of Rehabilitation and Employment Related to Administration of Workmen's Compensation Laws. E. P. Luongo. —p. 1.
Analytic Methods in Diagnosis. L. T. Fairhall.—p. 13.
Rehabilitation of Limbless: A Joint Surgical and Psychologic Study. E. Wittkower.—p. 20.
Fitting the Service to the Plant. W. H. Seymour.—p. 45.
Industrial Injuries of the Back. F. Dickson.—p. 53.
Administrative Uses of Statistical Data in Development of Industrial Hygiene Programs. W. M. Gafafer.—p. 65.
Industrial Exposure to Lead. May R. Mayers.—p. 77.

Radiology, Syracuse, N. Y.

48:107-212 (Feb.) 1947

Observations on Etiology and Frequency of Spondylolisthesis and Its Precursors. W. Bailey.—p. 107.
Roentgen Features of Mucocele of Appendix. E. J. Euphrat.—p. 113.
Roentgen Treatment of Infections of Tonsils and Postpharyngeal Lymphoid Tissues in Children. A. F. Rossitto.—p. 118.
*Fractures Following Electroshock Therapy. J. R. Lingley and L. L. Robbins.—p. 124.
Cardiac Enlargement. H. E. Ungerleider.—p. 129.
Benign Ulceration Within Duodenal Diverticulum: Report of Case. C. G. Weig.—p. 143.
Reactions of Connective Tissues After Protracted Fractionated Irradiation of Laryngeal Carcinoma. F. Windholz.—p. 148.
Biologic Significance of Fibrinous Radiomucositis of Larynx. F. Windholz.—p. 157.
Latex Cap for Radon Ointment Treatment. C. S. Lipp and R. Smith. —p. 161.
Retroperitoneal Perforation of Duodenum: Report of Case.—p. 164.
Carcinoma of Transverse Colon in 15 Year Old Boy: Case Report with Short Summary of Literature. H. R. Fishback Jr.—p. 168.
Some Practical Aspects of Hip Nailing. H. W. Morgan.—p. 172.
Application of Inverse-Square Law to Oil-Immersed Tubes. R. S. Landauer.—p. 175.

Fractures Following Electroshock Therapy.—Lingley and Robbins report the results of a study on 230 patients who had received electroshock therapy varying from a single treatment to several series of treatments. The convulsions lasted about forty-five seconds, during which the patient was held by five attendants. The attendants were experienced and realized the importance of not holding the subject too rigidly. Fifty-three, or 23 per cent, sustained fracture, predominantly of the vertebrae. The incidence of fracture was greater in males than in females, and in the younger and older rather than in the middle age groups. It seems that whether the convulsion is due to tetanus, epilepsy, therapeutic metrazol and allied drugs or to electroshock the number of bones fractured and the areas involved are probably dependent to a great extent on the severity of the convulsion. Bone conditions that appear to contraindicate shock therapy include osteoporosis, malignant lesions, Otto's pelvis, possibly Paget's disease, and syphilitic lesions.

Southern Medical Journal, Birmingham, Ala.

40:115-196 (Feb.) 1947. **Partial Index**

Evaluation of Certain Types of Renal Pain. R. M. Bobbitt.—p. 115.
Convalescent Care of Weakened Shoulder, with Particular Reference to Use of Overhead Sling. R. L. Bennett.—p. 120.
Some Misleading Manifestations of Otolaryngologic Infections and Tumors and Their Interrelationship. V. K. Hart.—p. 127.
Early Recognition of Pericarditis. D. A. Nathan.—p. 138.
*Simple Laboratory Aids for Control of Streptomycin Therapy in General Practice. J. K. Aikawa, C. M. Gillikin, E. G. Herndon Jr. and G. T. Harrell.—p. 141.
Practical Handling of Hematology by Clinical Pathologist. W. H. Riser Jr.—p. 153.
Management of Bulbar Poliomyelitis. A. H. Weiland, C. R. Burbacher and R. P. Keiser.—p. 157.
Obstetric Hemorrhage, Incidence and Management. W. R. Payne. —p. 161.
Relation Between Graves' Disease and Liver Pathology: Importance in Use of Thiouracil. P. R. Rezek.—p. 166.
Nutritional Factors in Prevention and Treatment of Hepatic Injury Due to Industrial Poisons. J. H. Eddy Jr.—p. 171.
Antianemic Properties of Pteroylglutamyl Glutamic Acid. T. D. Spies, R. E. Stone and R. Lopez Toca.—p. 175.
Outbreak of Gastroenteritis Caused by Salmonella Typhimurium, Presumably Water Borne. A. Reaud.—p. 176.

Control of Streptomycin Therapy.—Aikawa and his associates point out that streptomycin is the most useful drug available at present for the treatment of tularemia, influenzal meningitis and urinary or blood stream infections due to gram-negative bacilli. In vitro testing for susceptibility is useful before therapy is begun and in cases in which cultures remain positive. Infections should be treated vigorously from the start, and therapy should be controlled by laboratory methods. The dose and mode of administration must be individualized for systemic infections. For urinary tract infections doses of 1 to 2 Gm. daily are usually effective. The drug should be continued at least three days; if the patient has not improved after five days, the organism has probably acquired resistance and further therapy may be ineffective. Streptomycin is more effective in an alkaline medium; therefore, in urinary tract infections, the p_H of the urine should be increased to 8, if possible. Resistance to the drug develops rapidly and, once developed, it is permanent. Because resistance develops frequently in urinary tract infections complicated by obstruction to urine flow or the presence of a foreign body, it may be advisable to use other chemotherapeutic agents first and to reserve streptomycin for postoperative use.

Surgery, Gynecology and Obstetrics, Chicago

84:257-384 (March) 1947

New Technic for Pulmonary Segmental Resection: Its Application in Treatment of Bronchiectasis. R. H. Overholt and L. Langer.—p. 257.
Clinical Experiences with Use of Penicillin Treatment of Infections Involving Bones and Joints. H. J. McCorkle, H. Silvani, W. E. Stern and Helen Warmer.—p. 269.
Carcinoma of Prostate: Review of 130 Cases Treated Between 1940 and 1946. C. P. Mathé and C. E. Ardila.—p. 276.
*Studies on Anuria: Effect of Infusion Fluids and Diuretics on Anuria Resulting from Severe Burns. W. H. Olson and H. Necheles.—p. 283.
Diverticula of Stomach and Duodenum: Treatment by Invagination and Suture. L. K. Ferguson and C. S. Cameron Jr.—p. 292.
Growth of Human Trophoblast in Eye of Rabbit: Its Relationship to Origin of Cancer—Preliminary Report. C. Gurchot, E. T. Krebs Jr. and E. T. Krebs.—p. 301.
Blood Supply of Kidney, Suprarenal Gland and Associated Structures. B. J. Anson, E. W. Cauldwell, J. W. Pick and L. E. Beaton.—p. 313.
Simplified Repair of Common Duct: Use of Umbrella Catheter to Produce Internal Biliary Fistula. J. G. Montgomery.—p. 321.
*Unilateral Exophthalmos, an Early Sign in Thyrotoxicosis. W. H. Kisner and H. Mahorner.—p. 326.
Thoracicoabdominal Approach to Upper Abdomen. F. R. Harper. —p. 331.
Histopathology of Anal Ducts. G. L. Kratzer and M. B. Dockerty. —p. 333.
Extra-Articular Repair for Ruptured Collateral and Cruciate Ligaments. E. D. W. Hauser.—p. 339.
Anatomic Disarticulation of Hip. H. B. Boyd.—p. 346.
*Advantages and Limitations of Thiouracil Therapy in Thyrotoxicosis. E. F. Fowler and W. H. Cole.—p. 350.
Observations on Use of G-11 in Surgical Scrub. C. V. Seastone.—p. 355.
Plasma Fractions—"Fibrin Foam," Thrombin and "Fraction No. 1" in General Surgery. J. Fallon and W. F. Croskery.—p. 361.
Clinical Observations on Furacin Soluble Dressing in Treatment of Surface Infections. E. R. Shipley and M. C. Dodd.—p. 366.

Effect of Infusion Fluids and Diuretics on Anuria Resulting from Burns.—Olson and Necheles produced acute anuria in dogs. Plasma and saline solution were the least effective infusion fluids for combating the anuria. In increasing order of effectiveness were sodium lactate, 5 per cent dextrose in isotonic solution of three chlorides, 2 per cent urea in saline solution and 0.9 per cent saline solution with 0.87 per cent sodium bicarbonate. They were effective in instances in which kidney damage was not great. Isotonic solution of sodium sulfate was the most effective agent in combating burn anuria. The use of isotonic solution of sodium sulfate is recommended in the treatment of the anuria of burns and of related anurias.

Unilateral Exophthalmos in Thyrotoxicosis.—Kisner and Mahorner report 5 cases of unilateral exophthalmos due to toxic diffuse goiter. In all of these cases the unilateral exophthalmos was a prominent sign and in some it was the only one noticed by the patient. The cause of exophthalmos is not established, but from experimental studies it would appear that a factor in the anterior pituitary secretion has the property of producing exophthalmos, and the same or a different factor has the property of inducing hyperplasia of the thyroid gland. The erroneous impression exists that the exophthalmos immediately subsides following thyroidectomy, but even in cases with high basal metabolic rates the exophthalmos is frequently a little worse in the weeks immediately after the operation. Only after many weeks and months does the exophthalmos gradually subside. Because of the long time over which improvement in exophthalmos after thyroidectomy may occur, radical procedures such as the Naffziger operation should be deferred unless extreme proptosis greatly jeopardizes the sight of the eye.

The Advantages and Limitations of Thiouracil in Thyrotoxicosis.—According to Fowler and Cole, thiouracil reduces the basal metabolic rate to normal in at least 95 per cent of patients with hyperthyroidism. In a study of 1,543 cases collected from the literature, reactions were noted in 13.8 per cent of patients treated. The most serious reaction was agranulocytosis, which was encountered in 0.78 per cent of patients. Although much less serious, leukopenia was more common. Vomiting, dermatitis and pruritus also were encountered. Other reactions included purpura, localized edema, arthralgia and swelling of the salivary glands. The mortality rate of 0.45 per cent seems a serious disadvantage. In the 79 patients treated by the authors, reactions were slightly greater in number but less in severity than has been reported in the literature. The greatest advantage of thiouracil over iodine is in patients who are so toxic that bilateral thyroidectomy is unsafe under iodine therapy. The drug is particularly useful in patients with cardiac decompensation secondary to hyperthyroidism. Patients with mild toxicity and small glands are more apt to have permanent remissions than do other types. Patients with toxic diffuse goiter respond slightly better than do those with toxic nodular goiter. The most serious disadvantage is the toxicity and particularly the mortality rate.

Tennessee State Medical Assn. Journal, Nashville

40:33-66 (Feb.) 1947

Analysis of 107 Cesarean Sections. R. B. Austin.—p. 33.
Health Legislation Enacted by Seventy-Fifth General Assembly. C. B. Tucker and R. H. White.—p. 40.
Management of Traumatic Hemothorax. L. S. Whitaker.—p. 43.
Past Progress and Future Program of Tuberculosis Control. J. B. Naive.—p. 48.
Treatment of Benign and Malignant Neoplasms of Skin. C. G. Andrews.—p. 77.

Western J. Surg., Obst. & Gynecology, Portland, Ore.

55:147-208 (March) 1947

Transthoracic Resection of Carcinoma of Upper Midthoracic Esophagus: Report of 4 Cases. R. D. Pinkham.—p. 147.
Treatment of Carcinoma of Uterine Cervix: Considerations on Fiftieth Anniversary of Wertheim Operation. F. Buschke and S. T. Cantril. —p. 152.
Internal Fixation of Fractures. L. H. Edmunds.—p. 162.
Enteric Cyst of Coccygeal Region: Report of Case. P. Teng.—p. 167.
Rh Factor: Its Present Status and Clinical Importance: Division I.—p. 170.
Clinical Trial of New Synthetic Heptanone Analgesic (Dolophine): I. Preliminary Report. A. C. Kirchhof and N. A. David.—p. 183.
Extreme Shock and Near Death Resulting from a Douche. A. L. Natenshon.—p. 187.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Experimental Pathology, London

28:1-68 (Feb.) 1947

Influence of Chemical Constitution on Toxicity: General Survey of Acridine Series. S. D. Rubbo.—p. 1.
Precision of Plasma Volume Determinations by Evans Method. K. Mather, R. C Bowler and A. C. Crooke and C. J. O. R. Morris.—p. 12.
Anticollagenase in Immunity to Clostridium Welchi Type A Infection. D. G. Evans.—p. 24.
Antibiotic from Penicillium Tardum. N. Borodin, F. J. Philpot and H. W. Florey.—p. 31.
Antibiotics from Stereum Hirsutum. N. G. Heatley, M. A. Jennings and H. W. Florey.—p. 35.
*Experimental Goiter Studies: Thyroid Tumors in Rats Treated with Thiourea. H. D. Purves and W. E. Griesbach.—p. 46.
Investigation into Production of Bacteriostatic Substances by Fungi: Preliminary Examination of the Sixth 100 Species, More Basidiomycetes of the Wood Destroying Type. W. H. Wilkins.—p. 53.
Role of Coagulase in Staphylococcal Infections. W. Smith, J. H. Hale and M. M. Smith.—p. 57.

Thyroid Tumors in Rats Treated with Thiourea.—Purves and Griesbach found that prolonged administration of thiourea to rats caused formation of thyroid adenomas. After months of treatment 7 out of 13 of these tumors showed the histologic appearance of adenocarcinomas. Invasion of the blood vessel walls was visible in all 7 cases. In 2 of these cases lung metastases of thyroid tissue were found. In 3 thyroid tumors, 2 of which were malignant, solid masses of cells were found which resembled human "fetal adenoma." It is considered that these growths were derived from the cancerous tissue. The thyroid adenomas observed in these experiments retained in full their ability to respond to fluctuations in thyrotropic stimulation.

British Medical Journal, London

1:285-324 (March 8) 1947

Water and Salt Depletion. H. L. Marriott.—p. 285.
Medical Aspects of Penicillin Treatment. B. A. Young.—p. 290.
Place of Unilateral Renal Disease in Hypertension. C. Hardwick and A. W. Badenoch.—p. 293.
*Arsenical Encephalopathy: Unusual Case Occurring in Treatment of Congenital Syphilis. G. Hipps and R. Goldberg.—p. 296.

Arsenical Encephalopathy.—Hipps and Goldberg observed the development of encephalopathy in a soldier aged 20. The patient had congenital syphilis with interstitial keratitis and iridocyclitis and was being treated with penicillin and neoarsphenamine. After a provisional diagnosis of arsenical encephalopathy was made, treatment on the lines suggested by Ransome and his associates in 1945 was instituted, but this did not save the patient's life.

Journal of Hygiene, London

45:1-110 (Jan.) 1947. **Partial Index**

Photometric Method for Comparative Evaluation of Disinfectants. N. V. Needham.—p. 1.
Standardized Method of Disinfecting Infected Blood Clots. A. D. Gardner.—p. 12.
Growth of Bacterial Colonies and Their Viable Population. Anna Mayr Harting.—p. 19.
Mode of Origin of Sulfonamide Resistant Strains in B. Dysenteriae Flexner. F. H. Stewart.—p. 28.
Bacteriology of Dehydrated Vegetables. J. Rishbeth.—p. 33.
*Comparative Study of Phenolized and Alcoholized T. A. B. Vaccines. A. Drysdale.—p. 46.
Agglutination and Complement Fixation in Human and Rabbit Typhoid and Dysentery Serums and Specificity of Complement. R. T. Scholtens.—p. 50.
Digestibility of English and Canadian Wheats: Special Reference to Digestibility of Wheat Protein by Man. R. A. McCance and E. M. Widdowson.—p. 59.
Vitamin A Reserve of the Population in Denmark and Norway During the War. T. K. With and K. Ødegaard.—p. 88.
Some Skin Manifestations in Hypoparathyroidism. L. Spira.—p. 93.

Phenolized and Alcoholized T. A. B. Vaccines.—Drysdale says that in 1941 Felix described a new type of alcoholized T. A. B. (typhoid, paratyphoid A and paratyphoid B) vaccine and since then it has been emphasized that its protective value is greater than that of the standard phenolized vaccine, also that the general reactions are less severe. Drysdale describes trials of the comparative value of the two vaccines in man and animals. He could detect no difference in the immunologic potency of the two vaccines, but the contentions of Felix and others that the reactions with alcoholized vaccine are less severe and "Vi" response greater than with phenolized vaccine are confirmed.

Lancet, London

1:277-314 (March 8) 1947

*Spontaneous Compression of Both Median Nerves in Carpal Tunnel: Six Cases Treated Surgically. W. R. Brain, A. D. Wright and Marcia Wilkinson.—p. 277.
Purified Precipitated Diphtheria Toxoid of Constant Composition: (P. T. A. P.). L. B. Holt.—p. 282.
Clinical Trials of Diphtheria Toxoid Aluminum Phosphate Precipitated to Determine Optimal Aluminum Phosphate Content. G. Bousfield.—p. 286.
*Atelectasis After Partial Gastrectomy. P. Stringer.—p. 289.
*Pain and Healing of Peptic Ulcers. A. M. Gill.—p. 291.

Compression of Median Nerves in Carpal Tunnel.—Brain and his associates describe 6 patients, all middle aged or elderly women, who had bilateral median neuritis due to compression of the nerves under the transverse carpal ligament at the wrist. The symptoms were pain, paresthesia and cutaneous sensory loss within the distribution of the digital branches of the median nerves, and partial thenar atrophy limited to the abductor brevis and opponens pollicis muscles or even the abductor brevis alone. All were treated by surgical division of the transverse carpal ligament with immediate relief of pain and tingling and gradual improvement in power and diminution in sensory loss. The lesion found at operation was compression of the nerves in the carpal tunnel and edema for about 1 inch proximally. Extension of the wrist raises the pressure in the carpal tunnel. Occupations involving this movement may in time lead to compression of the median nerves. In housework, particularly in scrubbing and polishing, the hand holding the brush or the cloth is usually extended at the wrist and the other hand often rests with the palm on the flat surface and the wrist also extended. The authors stress the need of differentiating this syndrome of compression of the median nerve in the carpal tunnel from costoclavicular syndromes.

Atelectasis After Partial Gastrectomy.—Stringer investigated the incidence of atelectasis after partial gastrectomy by radiography of the chest immediately after, four hours after and twenty-four hours after operation in 55 cases. Twenty-six showed abnormal postoperative radiologic signs, and 13 showed signs of lobular, partial or total atelectasis. Signs first appeared radiologically at four hours in 5 cases and at twenty-four hours in a further 6 cases. The other 2 cases of atelectasis did not develop until later. Besides signs of atelectasis there were increased vascular markings in some cases, and 3 other cases showed bronchopneumonia, bronchitis and collapse with effusion. The film taken twenty-four hours after operation is the most valuable in determining whether or not atelectasis has occurred. If the cause of atelectasis is bronchial occlusion by a mucous plug, bronchoscopy should be considered.

Pain and Healing of Peptic Ulcer.—Gill cites examples of the erratic nature of the pain in patients with peptic ulcer. Severe hemorrhage and the presence of a comparatively large crater may at times be unaccompanied with pain, whereas in other cases the ulcer may heal and the pain continue as it does in phantom limb. The factors that cause an ulcer to heal are not easier to understand. Ulcers are not healed by diet alone, by injections or by medicines but because the man with the ulcer comes under the care of a physician who is able to transmit some of his own confidence to his patient.

Tubercle, London

28:41-62 (March) 1947

Tuberculin Surveys and the Tuberculin Test. B. Couts.—p. 42.
*Treatment of Minimal Tuberculous Chest Lesions: Comparative Study. R. Heller.—p. 49.

Minimal Tuberculous Chest Lesions.—Heller thinks that, owing to the detection of an increasing number of minimal chest lesions by mass x-ray surveys, their treatment assumes great importance. Patients were selected whose tuberculosis had been regarded as quiescent after having received institutional treatment for small, active unilateral lesions. There were 55 such patients who had been under observation for over one year to

eight years. Thirty-four patients had received only bed rest and routine sanatorium treatment. Of this group 17 patients relapsed, 2 of them twice. Twenty-nine patients received collapse treatment, 8 of these after having relapsed after a period of routine sanatorium treatment. None of the 29 patients in this group relapsed; all of them were well and working, and there were no complications. The policy of withholding collapse treatment in active minimal lesions because of a negative sputum and absence of cavitation appears unjustifiable. The duration of institutional treatment was longest for the collapse therapy group. The average time off work for the successfully treated patients was nearly twelve months. The patients who relapsed had only an average of eight months off work. The author believes that many relapses could have been avoided by earlier institution of collapse treatment.

Monatsschrift für Psychiatrie und Neurologie, Basel

113:1-64 (No. 1) 1947

Clinical Picture Produced by Bilateral Destruction of Cortex of Cornu Ammonis. E. Grünthal.—p. 1.
*Is There a Rheumatic Form of Facial Paralysis? P. Winternitz.—p. 17.
Syndrome of Anterior Spinal Artery. D. Louis-Bar.—p. 40.
Genetic Causes of Schizophrenic Symptoms. E. Slater.—p. 50.

Rheumatic Facial Paralysis?—Winternitz analyzed histories of patients admitted to the clinic in Leiden between 1934 and 1945. Among 233 patients with peripheral nontraumatic facial paralysis 24 had a history suggesting that rheumatism possibly had occurred beforehand, while among 136 parallel patients without peripheral facial paralysis 41 had rheumatism. Conversely, among 200 patients with rheumatism chosen at random, not 1 was found with a history of peripheral facial paralysis. The author concludes that most attacks of nontraumatic facial paralysis arise from unknown causes and that the rheumatic nature of the condition has not been demonstrated.

Schweizerische medizinische Wochenschrift, Basel

77:229-250 (Feb. 15) 1947

Function of Liver from Clinical Point of View. A. Vannotti.—p. 229.
Clinical Observations on Appearance of Atypical Sore Throat with Unusual Inflammation of Cervical Lymph Nodes. H. Iselin, E. Luscher and A. Weder.—p. 233.
*Experimental and Clinical Data on Employment of Artificial Radioactive Isotopes with Aim of Localized Radiotherapy. J. H. Muller.—p. 236.
Follicular Keratosis and Vitamin Deficiency. E. Pulay.—p. 239.

Radioactive Isotopes for Localized Radium Therapy.—Muller says that radioactivity diffused through the entire organism can be obtained by administering radio sodium (N^{24}) or radio phosphorus (P^{32}) by ingestion or by intravenous injection. He demonstrates a method permitting the application of the radioactive isotope radio zinc (Zn^{63}) in order to achieve a localized radiotherapeutic action. In order to avoid diffusion of the isotope outside the region of application, the radio zinc is suspended in a macrocellular medium with a pectin base. Interesting palliative results have been obtained with this method in a small number of cases with extensive peritoneal carcinosis. It is possible with this method to make intratumoral and peritumoral radioactive infiltrations without diffusion of the radioactivity outside the site of application. The method is still in the initial stage. Its employment on a larger scale depends on being able to obtain radioactive isotopes in sufficient quantities. It is also desirable to obtain isotopes with a more prolonged action than radio zinc.

Hoja Tisiologica, Montevideo

6:1-154 (March) 1946. **Partial Index**

*Intoxication by Hydrocarbons: Cases. A. Crisci, A. Rodriguez and J. J. Scandroglio.—p. 1.

Intoxication with Hydrocarbons.—Two adult patients with pulmonary tuberculosis and bilateral pneumothorax were given intravenous injections of 4.5 and 10 cc. respectively of kerosene from a flask labeled calcium chloride. The immediate symptoms were those of violent cough, suffocation and cyanosis followed by blackish expectoration, fever and mental confusion. The predominant symptoms were those of toxic pulmonary alveolitis. Roentgenograms of the chest showed fat miliary nodules in both lungs, especially in the normal lung. Decompression of pneumothorax was carried out in 1 patient and 120 cc. of serohemorrhagic pleural liquid was removed from the other. The toxic symptoms subsided in two weeks. Roentgenograms of the chest six and fifteen months later showed that the intoxication had neither a harmful nor a beneficial effect on the course of tuberculosis.

Prensa Médica Argentina, Buenos Aires

34:125-164 (Jan. 17) 1947

Pyloric Syndrome of Ulcer or Neoplasm of Small Curvature. N. Romano.—p. 125.
Plastic Repair of Nasal Defects. M. González Ulloa.—p. 133.
Pulmonary Heart. M. R. Baila.—p. 138.
*Solubility of Various Preparations of Curare Added to 2.5 per Cent Solution of Sodium Pentothal. M. P. Cellados Storni.—p. 145.
Blood Transfusion and Coagulation Time. A. S. Benchimol.—p. 154.

Solubility of Curare Preparations When Added to Sodium Pentothal.—Formation of a white precipitate when curare and pentothal come in contact is the chief obstacle to their simultaneous administration. Collados Storni believes that the formation of the precipitate depends on the concentration and purity of the curare solution. He found that the following four solutions of curare can be added to 10 cc. of a 2.5 per cent solution of sodium pentothal without producing a precipitate: 0.8 cc. of intocostrin, 0.6 cc. of curare extract (Lilly), 2.4 cc. of fraction 21 A of curare extract (Abbott) or 3 cc. of solution of d-tubo curarine. The d-tubo curarine equivalents of the curare content per cubic centimeter in these pentothal-curare mixtures are respectively 0.22, 0.17, 0.580 and 0.69 mg. When protected from air and kept at a temperature of 4 C. the compatible mixtures of these solutions of pentothal and curare remain liquid and retain their pharmacologic properties for longer than a week.

Revista Clinica Española, Madrid

24:81-142 (Jan. 31) 1947. **Partial Index**

*Pulmonary Tuberculosis and Syphilis. T. Cerviá and V. Gutiérrez.—p. 81.

Pulmonary Tuberculosis and Syphilis.—Syphilis in various stages was encountered in 20 of 389 patients with pulmonary tuberculosis. One patient had pulmonary syphilis alone and 2 had both syphilitic and tuberculous lesions. Syphilis exerts an unfavorable effect on the course of pulmonary tuberculosis. The treatment is that of arsenicals and bismuth for about six months. This therapy is not advisable for emaciated patients, patients with diffuse tuberculosis or patients with blood spitting. Serologic examination for syphilis is advised as a routine in antituberculosis centers.

Revista Médica de Chile, Santiago

74:799-854 (Dec.) 1946. **Partial Index**

Classification of Forms of Icterus. H. Ducci C.—p. 799.
Tetralogy of Fallot. G. Dussaillant G. and M. Guerrero.—p. 803.
*Revision of Results Obtained in 125 Subcutaneous Implantations of Testosterone Tablets. L. Vargas F. and A. Lucchini A.—p. 809.
Cerebral Atrophy. H. L. Plaza.—p. 816.

Subcutaneous Implantation of Testosterone.—Vargas and Lucchini review 78 cases in which 125 implantations of testosterone tablets were performed. In women with carcinoma of the breast, pains in the bones disappeared, there was an improvement in the general condition and the period of survival was lengthened. In patients with uterine fibromyoma there were suppression of metrorrhagia, reduction in the size of the tumor and temporary amenorrhea. The tablets effected considerable improvement in the general condition in the male climacteric. In patients with prostatic adenoma, dysuria and the size of the tumor decreased. Growth of the genitalia was observed in 1 patient with male hypogonadism, but of 6 patients with impotence only 1 noted improvement. In 2 patients with adrenal insufficiency weight and blood pressure improved and tachycardia and weakness decreased. Favorable results were obtained in functional menorrhagia in that either the menstrual cycle became regularized or transitory amenorrhea resulted. In patients with fibrocystic mastitis pain and the tumor disappeared and recurrences were prevented.

American Review of Soviet Medicine, New York

4:195-288 (Feb.) 1947

New Method of Osteoplastic Amputation and Reamputation of the Femur. Y. Y. Djanelidze.—p. 196.
Treatment of Contractures with Novocaine Block. N. A. Krysheva and S. M. Panyutina.—p. 198.
*Action of Prostigmine on Paralysis Following Cerebral Trauma. N. I. Grashchenkov.—p. 201.
Influence of Extracortical Factors on Function of Central Nervous System. L. Orbeli.—p. 206.
Study of Structure of Micro-Organisms with Aid of Electron Microscope. A. E. Kriss, E. A. Rukina and B. M. Isayev.—p. 212.
Spontaneous Rupture of Spleen. A. Lurye.—p. 223.
*Significance of Lymph and Other Elements of Lymphatic System in Antivirus Immunity: First Communication. S. Y. Gaidamovich and V. D. Soloviev.—p. 226.
*New Type of Vaccine from Typhus Lice. A. V. Pshenichnov and B. I. Raikher.—p. 231.
Fight Against Intestinal Infections. P. F. Bilikov.—p. 238.
*New Blood Albumin Substitute. N. A. Fedorov.—p. 243.
Treatment of Diabetes Mellitus Without Insulin. G. P. Sakharov and D. M. Rossiski.—p. 250.
Restoration of Heart Rhythm During Fibrillation by Condenser Discharge. N. L. Gurvich and G. S. Yuniev.—p. 252.
Stimulating Properties of Granulation Tissue. I. M. Neuman.—p. 257.

Neostigmine in Paralysis Following Cerebral Trauma.—Grashchenkov injected neostigmine one or more times in nearly 300 cases of cerebral trauma with paralysis. In most cases there was immediate and lasting motor and sensory improvement; in some this was striking, and in only 6 per cent was no improvement observed. The author concludes that neostigmine corrects functional asynapsis—the functional elimination of structural intact nervous elements exposed to the toxic autolytic products of adjacent destroyed tissue. It is presumed that neostigmine exerts a direct beneficial effect on the altered enzymatic processes in these poisoned tissues as well as an indirect effect via the vegetative nervous system.

Lymphatic System in Antivirus Immunity.—Comparative studies were made by Gaidamovich and Soloviev between the anti-influenzal titer in the lymph, lymphocytes and lymph nodes and the amount of antibody circulating in the blood. The studies which were made on rabbits revealed that the amount of anti-influenza antibody in the lymph of rabbits immunized with influenza virus is proportional to that in blood. The antibody titer in lymph is some 60 per cent of that in the blood. No antibody has been found in the cellular elements of lymph. When antigen is introduced into rabbits, the regional lymph nodes contain the corresponding (anti-influenza) antibody regularly, although in small quantities. In view of the fact that antibody is linked with the globulin fraction of protein, it is to be expected that the amount of antibody in the lymph is proportional to its content of globulin. This has been confirmed in experiments with bacterial agglutinins, hemolysins and antitoxins and by the described experiments on anti-influenza antibody. Similar results were obtained in preliminary investigations on the lymph antibody level in animals immunized with other viruses, such as virus of equine encephalomyelitis and of silver fox encephalitis. The negative results regarding the content of anti-influenza antibody in the cellular elements of lymph are at variance with the theory of antibody formation in lymphocytes.

New Type of Vaccine from Typhus Lice.—Pshenichnov and Raikher succeeded in developing a simple method of infecting lice with typhus by artificial feeding of the bloodsucking insects on epidermal membranes obtained from cadavers. The membrane is stretched over a feeding camera. Under the stretched membrane defibrinated blood is introduced, to which are added crushed lice containing the typhus virus. The larvae spread on the surface of the membrane speedily attach themselves and begin to feed. In the apparatus constructed by the authors, which contains twelve feeding cameras, 60,000 to 200,000 larvae can be fed simultaneously. The development of the virus and the appearance of enormous quantities of rickettsias both within and outside of the cells takes place on the eighth or ninth day. From the moment of infection to the moment of development of virus the larvae are fed twice daily on donor convalescents for twenty minutes at a time. After the fifth day of infection smears are prepared daily from each batch of larvae. The development of virus can be gaged by the staining of the rickettsias. The authors describe the preparation of the vaccine and discuss its antigenic properties. They stress that this new method of preparing typhus vaccine from lice is cheaper and simpler than the Weigl method and can be applied on a large scale. The vaccine when tested on human beings caused little reaction. It protected persons exposed to small doses of virus but not to massive doses. Typhus is mild in the vaccinated.

New Blood Albumin Substitute.—A protein substitute for blood was worked out by Fedorov with the introduction of nonanaphylactogenic foreign protein which was obtained from milk casein. This protein can be used for intravenous injections and for repeated introduction in large doses without harmful effects. The solution can be used for substitution or stimulation therapy.

Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam

91:297-352 (Feb. 8) 1947. **Partial Index**

Lempert's Operation for Otosclerosis. J. Venker.—p. 303.
*Prevesical Prostatectomy According to Terence Millin. N. J. Bakker.—p. 306.
Congenital Defects of Forearm: Bilateral Radioulnar Synostosis. A. Van Der Sar.—p. 313.
*Special Form of Hyperchromic Macrocellular Anemia. G. M. H. Veeneklaas.—p. 316.

Prevesical Prostatectomy According to Millin.—Bakker and van Gulik employed Millin's retropubic method in 32 cases with 1 fatality. The method is technically easier than the one of Young and McCarthy, its mortality rate is low, convalescence is less trying for the patient as well as for the nursing personnel and the time in which postoperative care is necessary is shorter. Millin's retropubic, prevesical method of prostatectomy is a valuable addition to the surgical methods for hypertrophy of the prostate.

Special Form of Hyperchromic Macrocytic Anemia in Nurslings.—Veeneklaas observed a hyperchromic macrocytic anemia in 2 children who were about 1 year old. The diet of both these children had contained neither greens nor fruit. There was also dystrophy, enlargement of liver and spleen, urobilinuria and an increased indirect Hijmans van den Bergh test. The addition of fresh vegetables and fruit to the diet of 1 patient was followed by a rise in reticulocytes in ten to fourteen days; in the second patient the addition of fresh endive had the same effect. Complete recovery resulted in six to eight weeks.

Nordisk Medicin, Gothenburg

32:2901-2986 (Dec. 20) 1946. **Partial Index**

Hospitalstidende

Folic Acid and Its Effect on Pernicious Anemia. M. Jersild and E. Meulengracht.—p. 2935.
Simple Suture of Perforated Gastric and Duodenal Ulcer: Survey of 53 Cases. Jørgen Ernst.—p. 2938.

Finska Läkaresällskapets Handlingar

*Functional Changes in Electrocardiogram in Neurocirculatory Asthenia. J. Burstein.—p. 2944.

Hygiea

Centenary of Ether Anesthesia. G. Lijestrand.—p. 2951.
High Stomach Resection in Ulcer and in Gastritis. H. Wahren.—p. 2958.

Functional Changes in Electrocardiogram in Neurocirculatory Asthenia.—Burstein studied the electrocardiograms of 136 patients with neurocirculatory asthenia. Psychic strain is an important immediate cause; exhaustion and other factors, especially acute infections, are also significant. In some cases defective coronary circulation may play a part. There is practically always a sympathicotonic influence affecting the whole heart; the heart rate is considered an indicator of its tone. On increasing heart rate the PQ interval shows a reduction in lead 1 and remains constant in leads 2 and 3. P_1 is not notably affected by the heart rate, but P_2 and P_3 rise continuously on increasing heart rate. The fairly common occurrence of P pulmonale is the electrocardiographic expression of increased influence of the sympathetic on the whole heart. The T waves become lower on the average as the rate increases, reduction of T_3 occurring only with the highest rate. Axis deviation, bodily structure, emphysematous changes and cor parvum have but little effect on the height of the P and T waves.

Book Notices

Heparin in the Treatment of Thrombosis: An Account of Its Chemistry, Physiology and Application in Medicine. By J. Erik Jorpes, M.D., Reader in Biochemistry, The Caroline Institute, Stockholm. With a foreword by J. B. Learmonth, C.B.E., Ch.M., F.R.C.S.E., Professor of Surgery, University of Edinburgh, Edinburgh. Oxford Medical Publications. Second edition. Cloth. Price, $6.50. Pp. 260, with 22 illustrations. Oxford University Press, 114 Fifth Ave., New York 11; Amen House, Warwick Sq., London, E. C. 4., 1946.

More than seven years have elapsed since the publication of the first edition. Seven years ago the author wrote sixteen pages on the clinical application of heparin, the rest of his treatise being devoted to the discovery and chemistry of heparin, to which he had made such notable contributions. This edition not only enlarges on the theoretical considerations but is a detailed statistical record of the clinical applications of heparin and its rival anticoagulant dicumarol. It appears from the figures of Swedish clinicians that not only has the mortality of thromboembolism been cut to a minimum by the use of heparin, not only has the prophylactic use of the anticoagulant prevented thrombosis to a very appreciable degree, but the proper and early use of heparin has throttled the appearance of the late sequelae of thrombosis, the indurations, ulcerations and disabilities, which are a serious economic drain on the patient and the community.

Perhaps the most striking virtue of the treatise is the way it fills the gap between the facts of pure chemical research and its clinical application. Because of the work of the Swedish group headed by Jorpes and Craafoord and the Toronto group of Best and Murray, the physician of today has been presented in heparin with a drug as specific for thrombosis as insulin is for diabetes. There is no field in medicine in which heparin and also dicumarol could not be used in saving lives, decreasing morbidity and eliminating long-lasting disabilities due to thromboembolism.

There is a great lesson to be learned from this book, which incidentally is beautifully printed and illustrated: the value of cooperative research of the Swedish institutions, which, in spite of a population of little over six million inhabitants, has furnished such a mass of statistics.

Jorpes finishes his book with an interesting comparison. Between 5,000 and 6,000 persons are injured every year by automobiles in Sweden. The same number of thromboses occur annually in that country, and one has every reason to believe that the sequelae in the thrombotic group were more severe. As a prophylactic and early therapeutic measure, heparin assumes increasing social and economic significance.

Der Rhesusfaktor: Seine theoretische und praktische Bedeutung. Von Prof. Dr. G. Fanconi, Direktor der Universitäts-Kinderklinik, Zürich, et al. Paper. Price, 10 Swiss francs. Pp. 160, with 23 illustrations. Benno Schwabe & Co., Klosterberg 27, Basel, 1946.

The Rh factor was discovered in this country by Landsteiner and Wiener in 1940. Soon afterward Wiener described its relation to blood transfusion reactions and Levine to fetal erythroblastosis. Only after the war have articles on this subject begun to appear in European continental literature. The monograph is made up of seven papers read at a meeting of the Zurich Pediatric Society on Nov. 30, 1945. The first chapter, by Fanconi, is a brief eight page review of the clinical significance of the Rh factor. The antigenic blood group structure of the human red cell is reviewed by Grumbach in the second chapter. The next chapter, by Zwingli, on experiences with the Rh factor in the Zurich Children's Hospital, deals mainly with the relation of icterus gravis to residual disturbances of the central nervous system (so-called kernicterus). E. Ziegler's 50 page chapter is a keen analysis of the pathogenesis of fetal erythroblastosis (the term "hemolytic disease of the newborn" is used in the monograph). The role of hemolized blood, of hepatic and capillary damage and of allergy is discussed in great detail. Liver therapy beginning early in pregnancy (second or third month) is recommended as a means of preventing the disease in the fetus. Specifically devoted to therapy of fetal erythroblastosis is Willi's contribution. He recommends continuous drip infusion of a fluid regrettably called by its trade name Tutofusin (possibly similar to isotonic solution of three chlorides). From 200 to 250 cc. is given daily for not more than three days. In connection with recent recommendations of replacement transfusions, reference to its use by de Lange in 1934 is worth noting. The final two chapters, by Zollinger, are no doubt the most important of the book. His well illustrated discussion of the gross and microscopic changes in fetal erythroblastosis is thorough, complete and lucid. Well presented is the correlation of biliary cirrhosis in the infant and child with hepatic damage in erythroblastosis based on a study of 30 cases. The Swiss writers are on the whole familiar with American and British publications, but some glaring errors have crept in: the discovery of the relation of the Rh factor to erythroblastosis is credited by Zollinger to Broman, who reviewed the subject in 1944, four years after Levine's publication. Similarly Foord and Fiske's observation that animal anti-Rh serums fail to distinguish between Rh-positive and Rh-negative erythrocytes of the newborn is also erroneously attributed to Broman by Ziegler.

The Theory of Human Culture. By James Feibleman. Cloth. Price, $5. Pp. 361. Duell, Sloan and Pearce, 270 Madison Ave., New York 16, 1946.

The science of medicine has become more and more related of late years to the social sciences. The concept of psychosomatic medicine demands of the physician a thorough knowledge of philosophy and psychology as well as sociology. This volume presents cultures of primitive peoples with a view to determining the evolution of present civilized customs and mores. Attention is given to the Maya and Pueblo Indian cultures and to a group known as the Baiga. Baiga culture emphasizes the essential freedom of the individual.

An interesting chapter deals with the mythology of modern science. The work concludes with an analysis of an advanced culture, that of England, and with a chapter devoted to preventive psychiatry. The author feels that the practical merit of the psychoanalytic procedure is undeniable even though the metaphysical claims that have been advanced for it by its founder and his loyal followers cannot be admitted. He concludes:

"Psychoanalysis through interview, free association, and the analysis of dreams analyzes those psyches in which falsity exceeds truth in action, where the criterion is social agreement. Common sense by comparison analyzes those psyches in which truth exceeds falsity in action, by the same criterion. Psychoanalysis is a method for treating the mentally sick. Common sense analysis is a method for improving the knowledge of those who are averagely well. The task of common sense analysis is numerically by far the greater. Since every one has an unacknowledged philosophy, it is always possible for this philosophy to be consciously known and steadily improved by raising to the level of consciousness what is held subconsciously in the depths of the psyche."

The aim of the author has been to develop studies in culture to the status of science. He is convinced that social studies can be made scientific and that the social scientists have thus far been misled in their understanding of the scientific method.

A Surgeon's Domain. By Bertram M. Bernheim, M.D., Associate Professor of Surgery, The Johns Hopkins Medical School, Baltimore. Cloth. Price, $3. Pp. 253. W. W. Norton & Co., Inc., 101 Fifth Ave., New York 3, 1947.

Dr. Bernheim has the certificate of competent writing for the public that acceptance by the *Saturday Evening Post* verifies. Two of the chapters in this book appeared in that periodical; the success of those chapters caused him to undertake the larger work. He feels the need of some change for better distribution of physicians and more adequate returns for the young men who undergo the long apprenticeship necessary for surgery. He accuses medicine of having a high concept of scientific needs with a low concept of social needs. Unfortunately for Dr. Bernheim, it does not appear that he has during his long career participated greatly in the activities of medical organizations, nor is he apparently aware of much of the available evidence on some of the points he discusses. Had he been less the arm chair philosopher and more the active participant in the agencies on which rests the responsibility for working out medicine's social relationships, he might be considered in a better position to criticize as he does.

Social Work Year Book 1947: A Description of Organized Activities in Social Work and in Related Fields. Editor: Russell H. Kurtz. Ninth Issue. Cloth. Price, $3.50. Pp. 714. Russell Sage Foundation, 130 E. 22d St., New York 10, 1947.

This volume includes two parts. The first consists of 79 articles written by selected authors on various aspects of social work. Of special interest to the medical profession is the statement on medical care by Dean Clark, which is a considerable condensation of the subject largely reflecting the author's personal views. The article on public health comes from Dr. Wilson G. Smillie and is essentially a brief report on subjects of general interest in public health during the past year. Mr. Altmeyer himself contributes the article on social insurance. He is very much in favor of an overall insurance system, including protection against all common economic hazards from the cradle to the grave.

The second half of the book offers a directory of agencies of all types. One must go through the pages carefully to realize what a tremendous number of federal government agencies there are in the field of social welfare. Next come the voluntary agencies. According to the statement in the book, the National Tuberculosis Association has only a little over 3,000 members and yet there are 2,900 affiliated associations. It would be desirable to work out a questionnaire form for the national volunteer agencies which would reflect each of them more adequately in this directory.

Parenteral Alimentation in Surgery with Special Reference to Proteins and Amino Acids. By Robert Elman, M.D., Associate Professor of Clinical Surgery, Washington University School of Medicine, St. Louis, Missouri. Cloth. Price, $4.50. Pp. 284, with 31 illustrations. Paul B. Hoeber, Inc., 49 E. Thirty-Third St., New York 16, 1947.

This treatise, written by one of the leading investigators in the field, was awarded the Samuel D. Gross Prize for 1945. In the first chapter, a historical survey, one finds many interesting facts. The first intravenous injection of fluids was carried out experimentally in a dog by Sir Christopher Wren. Rudolph Matas of New Orleans in 1891 described 20 cases in which he injected 500 to 1,500 cc. of saline solution intravenously when there was considerable loss of blood. The second chapter deals with general indications for parenteral administration of fluids. Then follow chapters devoted to water and electrolyte, energy, vitamin, protein needs, clinical manifestations of protein deficiency, methods of parenteral protein administration, i. e. plasma, amino acids, hydrolyzed protein, practical parenteral alimentation, clinical results with parenteral alimentation—eleven chapters in all. It is not possible in limited space to discuss in detail a book of this type. A number of positive statements are made concerning questions that are still controversial. Suffice it to state that the author, writing in a clear, concise manner has admirably reviewed the pertinent literature in the field, combines experimental and clinical aspects in his discussions and offers practical suggestions for the clinical application of parenteral nutrition in a wide variety of conditions where such support is indicated. It is a unique work combining a detailed review, authoritative information based on the extensive personal studies of the author and an excellent bibliography. The book should be in every hospital library as well as among the current additions to the personal libraries of clinicians, who will want to consult it frequently.

Aérosols médicamenteux: Technique—physiologie—thérapeutique. Par L. Dautrebande. Paper. Pp. 207, with 63 illustrations. J. Duculot Gembloux, Belgium; Masson & Cie, 120 Boulevard Saint-Germain, Paris 6e, 1946.

This monograph is interesting in view of the increasing use in this and other countries of the "aerosol technic" for treating certain acute and chronic infections of the respiratory tract with nebulized penicillin, streptomycin and sulfonamides. The author, however, refers only to a few studies covering this application of the "aerosol technic" but includes some twenty years' experience with (*a*) the development of apparatus for the production of aerosols, (*b*) the conditions which effect the concentration, settling and physical state of liquid aerosols, (*c*) the local and general action of certain drugs in animals and man when inhaled as aerosols and (*d*) the application of the "aerosol technic" in the treatment of asthmatic conditions with bronchodilator drugs. The author reviews the literature covering other studies in which the "aerosol technic" has been employed. These include (*a*) immunizing against certain respiratory tract pathogens, (*b*) giving of insulin, (*c*) producing experimental airborne infections and (*d*) controlling them with germicidal aerosols and vapors, and (*e*) as a means of studying the pharmacodynamic action of a wide variety of drugs, when inhaled in the nebulized form, on the respiratory tract and other body organs. A long bibliography is included.

Henry Sewall: Physiologist and Physician. By Gerald B. Webb and Desmond Powell. Cloth. Price, $2.75. Pp. 191, with 15 illustrations. Johns Hopkins Press, Baltimore 18, Maryland; Oxford University Press, Amen House, Warwick Sq., London, E. C. 4, 1946.

This book is an excellent account of the life and work of Henry Sewall. The first chapter, entitled "Inheritance," deals with his ancestry. This is followed by a chapter pertaining to his youth and another to his college days. His attendance and activities in medical school and studies abroad are described in chapters four and five. A full chapter is devoted to Dr. Sewall as a physiologist, from the time he became professor of physiology at the University of Michigan in 1882. Here he conducted the famous studies on rattlesnake venom.

Beginning in 1884 Dr. Sewall had at least annual attacks of bronchial or pulmonary illness. In the spring of 1886 he went to Denver to recuperate but returned to Michigan the next October. His health again failed, and he was granted a leave of absence, and the University of Michigan conferred on him the unusual degree of honorary Doctor of Medicine. He and Mrs. Sewall returned to Colorado in 1888, where they spent the remainder of their lives. Here Dr. Sewall became internationally known as a physician. He began practicing in Denver in 1891 and resided there until his death in 1936. His numerous scientific accomplishments are related in this book, and it is pointed out how he used his home as a laboratory until the National Jewish Sanatorium provided him space. Thereafter he was most appreciative of all the modern facilities made available for his investigations.

Dr. Sewall's complete bibliography is included. His first paper appeared in 1878. Every year thereafter he published one or more papers, except 1889, until his death in 1936.

Dr. Webb, who was a fellow practitioner with Dr. Sewall for many years, has demonstrated on many occasions his wide knowledge of the history of medicine. Into this volume he and Mr. Powell, while presenting Dr. Sewall's activities and accomplishments, have woven rare and interesting contemporaneous historical events. This book is written in such a delightful style that physicians will find it both entertaining and instructive.

Black Anger. By Wulf Sachs. Cloth. Price, $3. Pp. 324, with 1 illustration. Little, Brown & Co., 34 Beacon St., Boston 6, 1947.

The author is a South African psychoanalyst who has written many works in his field and who has been concerned particularly with psychoanalytic studies. He is a member of the British and International Psychoanalytic Societies and may therefore be considered fully qualified in his field. The present book should interest the general readers as well as those who are especially concerned with psychiatry. The book is the true story of a native African medicine man approached from the point of view of the psychoanalyst who presents not only the life experiences of the subject but also his inner conflicts. The primitive society from which the medicine man emanated had developed its own psychologic treatments. The volume gives an interesting picture of the life of South African natives and the difficulties in adjustment of their culture to that of the white civilization in which they live.

Devil by the Tail: A Novel. By Langston Moffett. Cloth. Price, $3. Pp. 431. J. B. Lippincott Company, 227 S. 6th St., Philadelphia 5, 1947.

This is another story about alcoholism, summarized also from both the medical and the psychiatric point of view by the words opposite the contents page: "The characters and situations in this work are wholly fictional and imaginary and are not intended to portray any actual persons or groups of persons."

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

RECURRENT PNEUMONIA

To the Editor:—**A white woman aged 68 has had recurrent fever for eight weeks. Radical amputation of the right breast was performed three years ago for carcinoma. About eight weeks ago she began to have a fever which varied from normal in the morning to 102 F. in the evening. Physical examination disclosed that she was emaciated and pale. There were no other definite physical findings. X-ray examination of the chest showed an atypical pneumonia of the lower left lobe. Penicillin in adequate doses had no effect. The pneumonia gradually resolved, and the patient was afebrile for about one and one-half weeks. She again became febrile and another x-ray of the chest disclosed another atypical pneumonia in the same location. Penicillin, sulfadiazine and streptomycin were all tried without apparent benefit. Serial x-rays of the chest showed complete resolution of the pneumonic process. The patient has continued to have a recurrent fever since that time, the temperature remaining normal for eight to twelve days, then beginning to rise in the evenings to 101 to 102 F. for eight to twelve days. Since the beginning of the present illness the patient has had a moderately severe anemia, the average blood picture being hemoglobin 65 to 70 per cent, erythrocytes 3 to 3½ million, leukocytes 8 to 14 thousand; the differential count was normal. Bone marrow studies are negative. Liver function tests have been normal, including galactose tolerance, icterus index, van den Bergh, prothrombin time and urobilinogen. Urinalysis has been negative. The blood Wassermann reaction is negative. Agglutination tests for typhoid, paratyphoid and undulant fever have been negative. Blood culture has been sterile. Blood chemistry tests are also negative. Complete gastrointestinal series and gallbladder x-ray studies have given normal results, as well as x-rays of the long bones. In addition to the antibiotics the patient has received repeated blood transfusions, liver extract every two days parenterally, Lextron ferrous capsules and vitamin B complex. She has become progressively worse despite treatment.**

A. J. Edelstein, M.D., Johnstown, Pa.

ANSWER.—Recurrent pneumonias, especially in the same area, in a patient of 68 suggests partial obstruction from a number of causes, the chief of which is a primary or metastatic neoplasm. Viral pneumonia may relapse but is seldom followed by febrile attacks for two months. Tuberculosis, foreign body, bronchial stenosis and other causes must also be considered. Mention is not made of cough or of sputum, which might suggest bronchiectasis with recurrent peripneumonitis. In the case described in the query, metastatic neoplasm seems most likely, particularly after a mastectomy for carcinoma. Metastasis to the lung or pleura is common. Unrelated primary bronchogenic carcinoma is also possible. Further attempts at diagnosis should include bronchoscopy and aspiration of exudate to search for tumor cells after the method of Herbut (*M. Clin. North America* November 1946, p. 1384) and/or bronchography with iodized oil. If a neoplasm is present, other treatment is not indicated except that of the supportive type already used.

ELECTROCAUTERY

To the Editor:—**Please give the following information concerning the new Cameron Cauterodyne (Model M for ear, nose and throat use): 1. Can it be used in general ether anesthesia? 2. When used in tonsillectomy is the occurrence of secondary hemorrhages greatly reduced over the ordinary surgical removal? 3. What is the difference between the use of the dehydrating current and the desiccating current? 4. What is the consensus as to its use for daily office practice?**

R. A. Qaisling, M.D., Madison, Wis.

ANSWER.—1. There is a definite risk of explosion which does not permit the use of apparatus of this kind during the course of a general ether anesthesia. This is especially true if the operation is to be about the mouth, as in tonsillectomy.

2. Secondary hemorrhage is not reduced by comparison with its occurrence after ordinary surgical removal. It may not be any more frequent, but it is apt to come later and may be more stubborn than after surgical removal.

3. The difference between dehydrating and desiccating currents is more academic than practical. In the type of procedure under discussion, water is abstracted from the tissues. When the effect is superficial, one speaks of desiccation; when it is somewhat deeper, one can speak of a dehydrating effect, and the last and most destructive is the coagulating effect.

4. It is not easy to poll doctors who use this particular model. Its circuits have been accepted by the Council on Physical Medicine of the American Medical Association, and there is every reason to believe that it is a reliable piece of apparatus. For strictly office use, not involving more ambitious operations, the same company has smaller models which are adequate.

TREATMENT OF TRENCH FOOT

To the Editor:—**What treatment is recommended for the residuals of trench feet? These patients, veterans of the European Theater of Operations, complain chiefly of increased sensitivity to cold, increased sweating, callous formation and occasional pain, tingling and numbness. Physical findings are usually minimal—mild color changes and slightly lowered skin temperature with little or no change in the peripheral pulse.**

M.D., Iowa.

ANSWER.—The late changes in trench foot can be readily divided into two groups: In the first, one can demonstrate excessive sympathetic activity as manifested by coldness, cyanosis, hyperhidrosis with desquamation of the epithelium and bromidrosis. Sympathetic block with procaine hydrochloride relieves these symptoms, sometimes permanently, more often just for a few hours or days. If the result of procaine block is evanescent, lumbar sympathectomy is indicated and has been successful in eliminating the vasomotor symptoms and the excessive sweating, with its consecutive blistering and bad odor. Unfortunately only about a fourth of patients belong to this group. The majority show peripheral nerve involvement, mostly of the plantar nerves, which result in pain on weight bearing, numbness and burning of the sole of the foot and toes, and intolerance to heat or friction. While anesthesia is rarely present, the areas complained of are either hypoesthetic or hyperesthetic. In this group one may also see stiffness of the toes, hyperkeratosis and other trophic changes which signify the severity of exposure and which are fundamentally due to the clotting of the plasma in the extravascular spaces and to increased capillary permeability. Treatment in this group has not been too satisfactory. Walking, swimming or bicycle riding increase the patient's confidence. Massage and whirlpool baths may give some benefit. Rubber heels or thick pieces of leather placed in front of the heel to shift the pressure from the painful metatarsal heads are helpful. However, this dysesthesia of the foot may last a long time and has not disappeared for years after the initial exposure. Obviously many patients show a mixture of the two syndromes. In these the preponderance of one or the other variety should direct treatment. It must be stated, however, that sympathetic denervation not only does not relieve the peripheral neuropathy but may aggravate the symptoms. That some of these patients suffer from a psychoneurosis is an additional warning against surgical procedures except in the clearcut vasospastic group in mentally stable persons.

REACTIONS TO UROGRAPHIC MEDIUMS

To the Editor:—**What is the incidence of reactions following the intravenous injection of opaque substances for urographic study? What is the incidence of fatalities? Is it current practice to do a preliminary sensitivity test with the radiopaque substance to be used? If not, should this be done?**

M.D., New York.

ANSWER.—Several cases have been reported in which a severe reaction followed the intravenous injection of opaque mediums currently employed in urography. It would be difficult to obtain exact figures on the incidence of such reactions.

The mediums most frequently employed at present are Neo-Iopax (disodium methyl-diiodo-chelidamate) and Diodrast (diiodopyridone acetic acid diethanolamine). Mild reactions immediately following the injection of either of these mediums occur frequently. As a rule they consist only of a feeling of intense heat, pain localized to the area of injection or nausea, which usually pass away in a few seconds. In about 5 per cent of cases such reactions become quite severe and occasionally may be accompanied with temporary prostration. If the substance is injected into the tissues outside a vein, the pain may be severe and persistent. Venous thrombosis also has been reported, which usually is localized to the vein injected.

Although fatality following injection of these mediums is infrequent, a number of such cases have been described and they probably occur more frequently than has been reported. On the other hand, in a series of more than 25,000 excretory urograms made with Neo-Iopax in recent years at the Mayo Clinic, only one fatality has been reported. A postmortem examination was not obtained in this case, but judging from the symptoms, death apparently was due to acute toxemia. It was found later that there had been a severe reaction following a previous urogram.

A routine test for sensitivity to iodine before injecting urographic mediums has been recommended. However, the rarity of fatal accidents and the difficulty of knowing whether such a test necessarily indicates a toxic reaction would make one question the advisability of its routine employment. Needless to say, care should be taken in the selection of the patients. It is questionable whether excretory urography should be employed in patients who are greatly debilitated from any cause or in those who are known to be allergic to iodine preparations.

CYANIDE POISONING FROM INDUSTRIAL SOURCES

To the Editor:—A mining company uses cyanide in processing its ore. There is a possibility that at some time traces of cyanide may pass through the tailings and enter the stream below the camp. What concentration of cyanide (mostly as sodium salt) would render this water unsafe for drinking purposes and be apt to kill fish in this stream? The stream flows over several small waterfalls and over rock for nearly 10 miles before coming to the next settlement. It requires a minimum of four to five hours to reach this village. The rock is mostly limestone. Would much of the cyanide remain under these circumstances? What symptoms might be expected to develop from prolonged ingestion of minute quantities of cyanide? Theodore Gallup, M.D., Holden, Wash.

ANSWER.—The frequency of poisoning from cyanides from industrial applications and waste products therefrom is surprisingly low in the light of the injurious properties of hydrocyanic acid and cyanides. Thousands of gallons of concentrated cyanide solutions from plating vats are dumped into the public sewers in every city without known subsequent damage to sewer workers or others. Spent materials from cyanide metal hardening furnaces are handled by the ton with almost complete disregard for potential injury. With the cyanide flotation method for metal concentration the average application of cyanide salts approximates 3 pounds per ton of water or ore. Since the average flotation mill concentrates approximately 100 tons of ore daily, the effluent water represents a content of some 300 pounds of cyanide. Slightly more than 53 per cent of sodium cyanide is made up of the cyanogen constituent; thus some large quantity such as 159 pounds of cyanogen daily may be brought in contact with the water effluent ultimately to be discharged into some stream. The rarity of poisoning from industrial application of cyanides (hydrocyanic fumigation excepted) is in part attributable to the facility with which cyanides are transformed to carbonates or other harmless compounds. In cyanide flotation work, even the fairly common dermatitis is more often attributable to commercially employed alkalis than to cyanides.

The maximum therapeutic dose of sodium cyanide is ½ grain (32 mg.) daily administered orally and intermittently. This represents approximately 16 mg. of cyanogen. Four times this quantity from a single intake has produced fatality in man. An atmosphere containing 0.2208 mg. of hydrocyanic acid per liter of air is tolerable for prolonged exposure. If a person breathes 6 cubic meters of air per day, the total intake of hydrocyanic acid would approximate 132 mg., although perhaps not more than one fourth, or 33 mg., might be retained in the body. It is probable that 10 mg. of cyanogen is near the daily maximum that can be tolerated by the body without demonstrable injury. In the instance described in the query it would be desirable to establish the fact that the daily intake of water does not provide a greater intake of cyanogen than 10 mg.

The situation may be different for fish life. It is not necessary to estimate the quantity of cyanogen that will destroy adult fish but only the quantity that will upset the normal piscatorial economy. Quantities of cyanogen possibly harmless to adult fish may inhibit the hatching of roe or kill off certain of the lower aquatic life forms essential to fish economy. Concentrations of cyanogen on the order of 0.0027 per cent may inhibit the hatching of certain aquatic life eggs and may kill protozoa. Therefore the peril to fish life may be greater than for human life.

It is almost certain that the usual content of cyanide from a flotation mill will have disappeared in any sizable stream after a flow of 10 miles with great water turbulence from waterfalls, and after an elapsed travel time of four or five hours. However, unusual circumstances such as the presence of agents that inhibit oxidation of cyanides or the fortuitous presence of acid may upset these calculations. Should actual damage arise, this will be shown in mild cases by vertigo, headaches, dyspnea, nausea, vomiting, salivation and tremors. In some instances in which cyanides from flotation mills have been suspected as a source of injury to human beings inquiry has established that arsenic derived from mineral acids or possibly from ores was the offender rather than cyanides.

References:

Bulmer, F. M. R.; Rothwell, H. E.; Polack, S. S., and Stewart, D. W.: Chronic Arsine Poisoning Among Workers Employed in the Cyanide Extraction of Gold, *J. Indust. Hyg. & Toxicol.* **22**: 111, 1940.

Permenter, D. C.: Observations on Mild Cyanide Poisoning, *J. Indust. Hyg.* **8**: 280, 1926.

Braddock, W. H., and Tingle, G. R.: So-Called Cyanide Rash in Gold Mine Mill Workers, *ibid.* **12**: 259, 1930.

Solis-Cohen, Solomon, and Githens, T. S.: Pharmacotherapeutics, Materia Medica and Drug Action, New York, D. Appleton & Co., 1928.

Department of Interior, Bureau of Mines, Report of Investigations, Ore Testing Studies, 1937-1938.

UNUSUAL DELAYED REACTION AFTER PENICILLIN IN PENDIL

To the Editor:—A patient developed acute bilateral mastitis ten days after delivery. She was given sulfathiazole and 100,000 units of penicillin in 3 cc. of Pendil twice daily intramuscularly in the deltoid muscles. The injections were discontinued after four days, as the inflammation had apparently disappeared. One week later the mastitis recurred in the left breast and two days later in the right breast, accompanied with high fever and chills. The patient was again given penicillin in the same dosage and in the same area. After five days the dosage was increased to 200,000 units per dose in 3 cc. of Pendil. More definite improvement followed, and at the end of ten days of treatment all signs of inflammation were gone. The penicillin was continued for four more days, making a total of fourteen days' treatment for the recurrent mastitis. There was no recurrence. About four weeks after completion of treatment the patient noticed large indurated areas over both deltoid areas. At times a large inflamed area would develop, last a few hours and then fade out. Several have remained red and at times become a dark purplish. The indurated areas have now gravitated downward in one place to a point about 2 inches below the elbow. They extend to all surfaces of the arm. In places a hard area 1 to 3 cm. in diameter and several inches long can be palpated. Considerable discomfort is present most of the time, especially at night. Hot saline applications and Benadryl 50 mg. four times daily have not had any appreciable effect. Has the Pendil (oil) not been absorbed and is this an allergic reaction? Any recommendations as to treatment will be appreciated. What is the prognosis? M.D., Texas.

ANSWER.—This is a most unusual delayed type of reaction. It probably represents hypersensitivity to one of the agents injected into the areas. Such a delayed reaction is probably not caused by penicillin. Pendil, as then marketed, is a combination of peanut oil and a cholesterol derivative. There is a possibility that the inflammatory reaction with hemorrhage is associated with the retention of this mixture in the tissues, and the acquired sensitivity is due to peanut oil. Since the reaction is unusual, a definite statement concerning prognosis cannot be offered. It is quite likely that the sites of reaction will show fibrosis eventually. Treatment should be directed to alleviating any local discomfort.

STREPTOMYCIN FOR CHRONIC PYURIA

To the Editor:—Would you please venture an opinion, comment and give a prognosis or suggestion in the following hypothetical case? A man aged 50 had either a pyelitis or a pyelonephritis two years ago which apparently subsided after two weeks of bed rest and treatment with methenamine and sulfonamide drugs. However, in five months it was found that the urinary tract infection had not cleared up and it has persisted ever since. Two years ago cystoscopy was done and a retrograde pyelogram made by a competent urologist. Repeated urine cultures have shown Escherichia coli and Streptococcus fecalis. He has received extensive treatment with sulfonamide compounds and penicillin. He is now receiving mandelic acid therapy. About nine months ago the patient started to have anginal pains on effort. He later developed a coronary thrombosis and has been bedfast for the past six months. He is relieved by glyceryl trinitrate 1/100 grain (0.65 mg.) and erythrol tetranitrate 1/6 grain (11 mg.) after each meal. Streptomycin therapy is contemplated. Please suggest the dosage of streptomycin. M.D., Kansas.

ANSWER.—Cystoscopy and retrograde pyelograms are indicated if the patient's condition will tolerate the procedure. This is important since streptomycin and other urinary antiseptics are ineffectual in the presence of urostasis or calculous disease. One or both of these states usually exists in the presence of persistent urinary infection. Recent literature suggests that susceptible bacteria rapidly lose their susceptibility to streptomycin. For this reason not less than 3 million units should be given during each of the first three days. This should be followed by 1 Gm. daily for an additional four days. Alkalization of the urine will enhance the effect of the streptomycin. Mandelic acid should be given consecutively with the urinary p_H established at 5.5 or lower because it is probably the best antiseptic for Streptococcus fecalis.

TREATMENT OF POSTPROSTATECTOMY PYURIA

To the Editor:—Please discuss the treatment of pyuria due to Bacillus coli infection after transurethral operations with special reference to sulfathiazole, sulfadiazine and sulfamid. What other methods are there to reduce pyuria? Samuel Rosenstein, M.D., San Antonio, Texas.

ANSWER.—The consensus seems to be that sulfadiazine and sulfathiazole are more efficacious than sulfamid. However, streptomycin is superior to these three sulfonamides. The important point in any patient with a persistent pyuria is the recognition of an associated pathologic condition that may be present and be the underlying cause. For instance, after a transurethral resection, residual urine may still be present, or there may be an infection in the prostatic bed. A study of the upper urinary system also should be made. This might reveal a hydronephrosis, "silent" renal stones or other pathologic findings.